The Goddeſs CERES *in her* Chariot *drawn by* Dragons, *Teaching* MANKIND *the* Art *of* Huſbandry.

A
COMPLEAT BODY
OF
HUSBANDRY.

CONTAINING

RULES for performing, in the moſt profitable Manner,
The whole Buſineſs of the FARMER, and COUNTRY GENTLEMAN,

IN

CULTIVATING, PLANTING, and STOCKING of Land;

IN

Judging of the ſeveral Kinds of SEEDS, and of MANURES; and in the Management of ARABLE and PASTURE GROUNDS:

TOGETHER WITH

The moſt approved Methods of Practice in the ſeveral Branches of HUSBANDRY,

From *Sowing the* SEED, to *Getting in the* CROP;

AND

In *Breeding* and *Preſerving* CATTLE, and *Curing* their DISEASES.

To which is annexed,

The whole Management of the ORCHARD, the BREWHOUSE, and the DAIRY.

Compiled from the Original Papers of the late THOMAS HALE, Eſq;

And enlarged by many New and Uſeful Communications on Practical Subjects,

From the Collections of Col. STEVENSON, Mr. RANDOLPH, Mr. HAWKINS, Mr. STOREY, Mr. OSBORNE, the Rev. Mr. TURNER, and others.

A WORK founded on Experience; and calculated for general Benefit; conſiſting chiefly of Improvements made by modern Practitioners in Farming; and containing many valuable and uſeful Diſcoveries, never before publiſhed.

ILLUSTRATED WITH

A great Number of Cuts, containing Figures of the Inſtruments of Huſbandry; of uſeful and poiſonous Plants, and various other Subjects, engraved from Original Drawings.

Publiſhed by his Majeſty's Royal Licence and Authority.

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M.DCC.LVI.

A

The PREFACE,

CONTAINING

The Plan of the WORK as publiſhed by the Proprietors with the firſt Numbers.

THE Occaſion of this Work aroſe from certain *Materials*, very conſiderable in *Quantity*, and, as we were informed, much more in *Value*; which came into our Hands by Purchaſe. They were collected by a Gentleman lately *deceaſed*, whoſe *Name* we are now authoriſed to mention; and were intended by him for the *Preſs*. They contain, as he obſerves, in an Introduction prefixed to them, what he had found of Value relating to the Subject in *Authors*, what he had learnt by Converſing with the moſt *intelligent Farmers*; and all he had diſcovered by an *active Experience* of more than *thirty* Years.

The Account we received of theſe *Papers* from ſome *undoubted Judges* into whoſe Hands we firſt put them, confirmed us in the Opinion that they might be *ſerviceable* to the *Publick*, as well as *advantageous* to *ourſelves*. The Methods we have taken to improve, illuſtrate, and compleat the Plan, the Publick have ſeen; and we hope they have appeared to them as *proper*, as they *ſeem* to us to have been *ſucceſsful*.

In Conſequence of our Advertiſements, we received many *Additions* in the different *Branches*; and were offered the Aſſiſtance of ſeveral Perſons of *Knowledge* and *Experience* in the Subject, to *methodize* and put the finiſhing Hand to every *Part*.

Being determined to ſpare no *Expence* or *Pains*, toward the rendering ſo *uſeful* an Undertaking as compleat as poſſible, we *purchaſed* every Paper of *Value brought* to us; and engaged ſo *many* of the *Hands offered* to our Aſſiſtance, that every *ſeparate Branch* fell under the Care of a *diſtinct Perſon*, who was a Maſter of that *Subject*.

It is now our Duty to thank thoſe Gentlemen from whom we have received Obſervations relating to the Subject in the *Counties* where they *live*, and whoſe *Names* with their Permiſſion we have inſerted in the Title.

The *firſt* Thing that appeared upon the Peruſal of *theſe Papers*, was the *great Inſufficiency* of all other *Books* written on this *Subject*: and the Want of *ſuch a Work* as the Materials they contained might ſupply, was not leſs evident.

The Authors who have written on *Huſbandry* have all failed, either in *Matter*, or in *Manner*. They have not been able to *inſtruct* the *Farmer*; or have not been Maſters of *Expreſſion* to convey their *Knowledge*. They have either treated *ſuperficially* what they only pretended to *underſtand*; or have buried their Experience under ſuch a Load of *needleſs* and *ill choſen Words*, that it has been found very difficult to underſtand them.

As we were aſſured there was *ſufficient Knowledge* contained in our Materials, we deſired the *Style* might be *plain* and *clear*; intelligible to the *Farmer*, and not below the *Gentleman*: ſo that every *Part* might be acceptable to every Reader.

After this Care that the preſent Work might be *underſtood* by *all* Perſons, we made Proviſion that they ſhould alſo in other Reſpects underſtand *one another*. Till this Time a Diſcourſe on the Subject of Huſbandry between the *Landlord* and his *Tenant*, was generally unintelligible to both: nor did the Farmer of *one* County underſtand the Language of him who lived in *another*. The moſt uſeful *Writings* have alſo loſt their Effect from the ſame *Cauſe*. This was an old and *general* Complaint; but no *Remedy* had been *hitherto applied*.

The Misfortune ariſes *ſolely* from the employing *Terms* in the *Art*, and *Names of Things*, uſed and underſtood only in *particular Places*, or only by the *working People*. To prevent this, not only all the Terms uſed in the preſent *Treatiſe* are clearly explained; but thoſe alſo which have been employed by *others*: So that Huſbandry will, we hope, be hereafter as generally underſtood, as it is univerſally uſeful.

Having thus explained the Manner in which our Plan has been *executed*; it will be proper to lay before the Public a ſhort View of what it contains.

We have uſed, as before obſerved, *all Endeavours* to compleat the Original Author's *Deſign*: and an Undertaking ſo extenſive, we are ſenſible leſs than the Aſſiſtance of *numerous Communications*, and the Labours of *many Perſons*, could never have *accompliſhed*.

Agriculture is here traced from its *ſmall* and *ſimple Original*; followed through the *ſeveral Ages*, and examined in the *Practice* of the *different Nations*, wherein it has been *improved* down to the *preſent* Time. From the *Harveſt* of the *old Romans*, it is purſued through the *Vineyards* of the *modern Italy*: nor are the late Improvements in *France*, or the uſeful Labours of the *Swede* or *Ruſſian* omitted. The Practice of one Country differs from that of others; yet they may learn one from another. Where the ſame Means have been uſed in different *Places*, and a different Event has followed; the Attempt has been to find the *Cauſe* of the Succeſs or Failure: that the Truth might be rendered apparent even from Contrariety.

Some Rules the Author has indeed collected from *Books*; but they appear little either in *Quantity* or *Uſe*, when compared with what he has *delivered* from *his own*, and *others Experience*. Having conſidered the *whole Compaſs of Huſbandry*, he takes it *all* for his Subject; comparing what he had *read* with what he had *ſeen*, and confirming or rejecting *Theory* by *Practice*.

The Gentlemen whoſe *Aſſiſtance* we have procured, have followed the *ſame* Plan; collecting from *Authors* whatever of Value he had omitted; and having thus inſerted in the Work a *Summary of all that has been written* on *Huſbandry*, they have added the much more *important* and much *larger Part*, all that has been diſcovered by modern *Practice*. Where Authors and Experience *diſagree*, they take *Experience* for their Guide; and where the Practice of one County, ſeems to contradict what has been advanced upon the Cuſtoms of another, the Determination is made on the Reſult of a careful *Compariſon*.

In this Work the *leaſt Things* are regarded with *Attention*, for the greateſt Events frequently *depend* on them. Nothing is aſſerted but upon *Experience* or *Proof*. The *old* Practice of Huſbandry is condemned or eſtabliſhed by the *new*. Eaſy and familiar Things are delivered firſt; and from them, gradual *Advances* are made to the more *difficult*. The Farmer will be thus led by the Hand, through his whole Buſineſs; and the *Landlord* will be *inſtructed with him*. The latter will be able to know in all *Circumſtances*, whether the other conduct himſelf *right*; and the Tenant cannot remain *ignorant* unleſs by his own *Fault*.

By theſe Means we hope the Advantages of our *Work* will be as *extenſive* as the *Plan*. The Information of the *Farmer* is the enriching of the *Landlord*: and the great Endeavour of our Undertaking is Inſtruction; as the ſole End propoſed from it is Uſe.

As the *Compaſs* of our Undertaking is ſo *large*; and the *Heads* it comprehends are ſo *very numerous*, we are ſenſible that a great deal of the *Plainneſs* and

Pro-

Propriety of the Work, muſt depend upon *their* proper *Arrangement*.

In the Intent therefore of leading the *practical Huſbandman* through the ſeveral *Branches* of his *Profeſſion*, he ſhall be introduced to the *Seat* of his *Induſtry*, (whether his own or rented) and the Work begun with *that Article* which is to come firſt under his Conſideration, the *Soil*.

This ſhall be treated of under its ſeveral natural Diſtinctions, whether it be *Clay*, *Loam*, *Sand*, *Gravel*, *Chalk*, or *Mellow Earth*, conſidering, if *Clay*, to which of the *four principal Kinds* it belongs; and in what Manner it may be *meliorated:* as alſo whether *Pits* may be opened for the *Pottery*, or *Brick* and *Tile-making*; for the *Brewery*; or *burning* for the Service of *other Lands*.

When we have in the ſame Manner, gone through the other five Kinds of Soil in Reſpect to their *Improvement* for Culture, and their *various Uſes*; we examine for what Purpoſes they are beſt ſuited, from their *Situation*, as well as *natural Qualities: Which* will be fitteſt for *Arable*, which for *Paſture:* whether in any Part *Marle* may be found at a *Depth*; or *Peat* near the Surface: in what Places *Art* may turn to Advantage the Imperfections of *Nature:* How the *Fenn* may furniſh a *Decoy*; and *Pits* may be converted into *Fiſh Ponds*.

From the Conſideration of the *Soil*, we ſhall riſe to that of the *Manures*; the numerous Kinds of which will be deſcribed; their Properties explained; and the particular Species pointed out, for different Services.

From theſe we ſhall enter on the Nature of the *Fences* in our ſeveral Counties; and treat at large of *Ditching*, *Draining*, *Hedging*, and *Planting*; of the Profits ariſing from *Coppice Wood*; and of the *Timber Trees* fit for ſeveral *Soils*, *Expoſures* and *Situations:* of the *Oak*, *Aſh*, *Elm*, *Beech*, *Maple*, *Walnut*, *Pear Tree*, &c. Under the Article *Oak* will be delivered the ſeveral Methods of *ſowing* the *Acorn*, and raiſing the *Tree* to its full *Strength* and *Value*; Rules for judging of the *Timber*, and the Ways of *ſeaſoning* it for laſting: giving the *Preference* under each Head, according to *Experience*. In the ſame Manner the reſt alſo will be conſidered.

After *planting* will be delivered the beſt Methods of *ſtocking* the Farm, under the Heads of the *Field*, *Yard* and *Stable*. And here will be introduced the Management and Advantages of the *Cow*, *Sheep*, *Horſe*, *Hog* and *Poultry*. On each of theſe Heads a *great Number of Rules* will be laid *down*, founded on ſucceſsful *Practice*; and reſpecting their *Breed*, their *Value* at their ſeveral *Ages*, their *Feeding*, and entire *Management*.

When the Farm is thus *prepared*, *planted* and *ſtock'd*, we ſhall advance to what more immediately bears the Name of *Huſbandry*. This will be conſidered as *general*, or *particular*. The ſeveral Kinds, reſpecting particular Articles, and diſtinguiſhed by the Names of *Drill Huſbandry*, and *Horſe-hoeing Huſbandry*, will be *explain'd*; and their *Advantages* and *Defects* ſhewn from the Reſult of *frequent Trials*.

The Practice of the Farmers in *different Counties* will be then *laid* down; and from the whole the careful Huſbandman will be fully informed with regard to *Plowing*, *Sowing*, *Harrowing*, *Rolling*, *Hoeing*, *Pulling*, *Cutting* and *Carrying*.

From theſe *general* Inſtructions, he will be led to the Conſideration of the ſeveral *Kinds* of *Seeds:* Under which Head he will be made acquainted with the *Nature*, *Properties*, and *Preparations* of *Wheat*, *Barley*, *Rye*, *Oats*, *Beans*, *Peas*, *Tares* and *Lentils*.

From theſe he will be led to the Knowledge and *Culture* of the ſeveral Kinds of *Graſs*; to be ſown either ſingly, or with his Corn. Here he will be inſtructed in the Nature, Value and Qualities of *Common Graſs*, *Clover*, *Saint Foyne*, *Lucerne*, and the like.

After which will be ſhewn at large the Culture and Uſes of ſuch *Roots* as may be advantageouſly planted in *Fields*; as the *Turnep*, *Potatoe* and *Carrot*.

From *theſe*, the Subject will naturally bring him to ſuch Articles as, tho' leſs *univerſal*, are not leſs *advantageous*. Among theſe will be particularly delivered the *Culture*, *Management* and *Profits* of *Hops*, *Flax*, *Hemp*, *Woad*, *Weld*, *Coleſeed*, *Liquorice* and *Saffron*, with Inſtructions concerning *Madder*, and ſome others, which tho' not cultivated at this Time in *England*, might be introduced with great Advantage.

From the immediate *Subjects* of his *Profeſſion*, he will be brought to the Conſideration of their *natural* and *artificial Products*; and among theſe particular Regard will be had to the *Uſe* and *Management* of *Milk*, *Cream*, *Butter*, *Cheeſe*, *Wool* and *Leather*.

The Accidents to which his *Cattle* or his *Crops* are liable, will after this be laid *down*; and the *Diſeaſes* to which they are *ſubject*; with the moſt *approved* Methods of *preventing* or *remedying* each.

Under the firſt Head will be ſhewn the Effects of *Drought*, *Rains*, *Hail*, *Snows*, *Winds* and *Blights*; at what *Times* they are to be *expected*; and by what *Means* the ſeveral Objects of Huſbandry may be moſt effectually *ſecured* againſt, or beſt *preſerved* from them.

The other Head of Enquiry will lead to the *Diſeaſes* and *Diſtemperatures* of his *Cattle*, *Corn* and *Trees*. Under the firſt Article will be conſidered the *Murrain*, the *Rot*, the *particular Diſtemper* now raging among the *horned Cattle*, and their being poiſoned by unwholeſome *Herbs*, *Inſects*, or *Waters*.

The *Cauſes* as well as *Symptoms* of theſe ſeveral Diſorders will be explained from *repeated Obſervations*, and the *Concurrence* of *Authors* and *Experience:* and the beſt *known* Remedies for *each* will be *ſet down*.

The Diſtemperatures of *Vegetables* will be arrang'd under three Heads, as they affect *Trees*, or *Roots*, *Corn*, and other *Herbage*. And in the Enquiry into their *Cauſe* and *Origin*, will be conſidered at *large* the Miſchiefs occaſioned by *Inſects*, as the *Fly*, *Slug*, *Worm*, *Grub*, *Caterpillar* and *Locuſt*; and every Method will be *inſerted* which *Experience* warrants, or *Reaſon* recommends to the Trial, for *their Deſtruction*, or the *Preſervation* of the *Crop*.

To theſe will be ſubjoin'd the Miſchiefs to which *Corn* and other *valuable Growths* are ſubject from *Weeds* and *Birds*, and the *eaſieſt* and moſt *certain* Methods will be delivered for the *Extirpation* of the one, and for Preſervation from the other.

From the ample, diſtinct, and plain Manner in which *theſe* and a Number of *other* ſubordinate Articles will be treated in the Courſe of this *uſeful* Work, we perſuade ourſelves the Farmer will be fully inſtructed how he is to conduct himſelf in the *Field*, the *Houſe*, the *Dairy*, the *Stable*, and in *Haymaking* and *Harveſt-Work*; and *that* in ſuch a Manner as to procure all poſſible *good*; and prevent all *ill* that can be *avoided*, in the Care of his *Plantations*, his *Stock* and his *Crop:* that the *Eſtabliſhed Huſbandman* will find many *profitable* things therein with which he was not *before acquainted*, and that the *young Farmer* will ſet out in his Profeſſion with the Advantage of others *Experience*.

The Plates will contain Figures beautifully engraved from Original Drawings.

1. Of the Inſtruments of Huſbandry uſed in different Counties in *England*.
2. Of all the poiſonous Plants in *England*.
3. Of the moſt uſeful and valuable Herbs wild or cultivated; and various other Subjects.

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TO THE READER.

THE Deſign of this Work is to inform the induſtrious Huſbandman in what manner he may get moſt by his Farm; at the ſame time doing leaſt Damage to the Land; or in many Caſes improving it all the while.

What we ſhall ſay on theſe Heads will be uſeful to the Land-owner as well as to the Tenant: and we ſhall be glad to inſtruct the Gentleman, while we aſſiſt the Farmer.

Many Things have been written concerning Huſbandry; ſome true and others falſe: but all that is valuable in thoſe Books may be comprized in a ſmall Compaſs; and we ſhall make it one part of our Buſineſs to pick the few Grains of Corn from the Loads of Chaff, and preſent them clean to the Reader.

A great deal has been done of late Years to amend the old Methods of Huſbandry; but the Experiments have been made ſome in one Place, and ſome in another. In treating of theſe we ſhall take the needful Pains to collect all together; and after that leave the experienced Farmer to make his Choice of ſuch as beſt ſuit his Purpoſe; tho' not without Advice on each Head.

Many things have been of late alſo publiſhed as Diſcoveries of great Advantage, which have their Grounds only in Fancy or Miſtake: theſe we ſhall carefully ſeparate from the true Improvements; condemning them as they deſerve: for, to miſlead the practical Huſbandman by falſe Relations; and entice him to a new Method by great Promiſes, which have not their Foundation in Fact, is both wicked and cruel.

This has been the Fault of many Books on the Subject; and too often an induſtrious Family has been ruined by believing them. It is this Cuſtom of boldly advancing Falſities, that has brought Diſcredit upon the Truth; and to the ill Succeſs of Experiments propos'd by ſuch deceitful Perſons, is owing the preſent Backwardneſs to meddle with any new Practice.

The Generality of Writers complain heavily of this Unwillingneſs in the Country People to follow their Methods; and they give it the harſh Names of Obſtinacy and Folly: the worſt exclaim the moſt; and all of them with very little Reaſon.

It becomes us to ſay, on the contrary, upon our own Knowledge, that

either the Farmers of this Kingdom are at preſent very different from thoſe who lived when ſome of theſe Complaints were made; or elſe that the Accuſations were altogether falſe.

Dr. PLOT *ſays, in his Hiſtory of* Oxfordſhire, *that the Huſbandmen of that County wou'd neither tell him what were their old Methods of proceeding, nor learn from him any others: Dr.* MORETON, *in his Account of* Northamptonſhire, *makes the ſame Complaints; and many other Inſtances might be produc'd.*

The Gentleman, upon whoſe Materials this Work is founded, has been in both thoſe as well as moſt of our other Counties; and it appears plainly, from his Account, that the Farmers in each were very willing to let him know their own Practice; and as ready to give any new Method a fair Tryal, which was propos'd to them in a plain and reaſonable Manner.

This Gentleman actually made many Improvements in the Huſbandry of thoſe Counties, as will be ſeen hereafter; and he every where ſpeaks of the Farmers, as we have always found them, both there and elſewhere, a plain upright ſenſible Body of Men: who for the Sake of their Families will continue in their old Courſe, except a new one that is propoſed be well explained to them: but who are always ready to hear ſuch as are able to inſtruct them.

Many Improvements will be propos'd to their Conſideration in the enſuing Sheets; but in order to ſuit the Work to Reaſon and Experience, we ſhall every where ſhew upon what Grounds they are founded; and we hope they will then take or refuſe them, according to their own Judgments.

But altho' there will be many new Things thus offer'd in our Work, it will not conſiſt of ſuch entirely. We ſhall in general be more careful to improve the old, than ambitious to advance new Methods. We ſhall in every Article endeavour to teach the conſiderate Farmer to make the beſt Uſe of his own Experience, and ſhall deſire he will let it in all Things finally direct and guide him.

When that which is propos'd, tho' it be ever ſo new, is in itſelf right, what he before knows in general of the Subject will confirm it: and if that ſafe and wiſe Adviſer, his Experience, in any Part fairly condemn the Practice, let him not think it worth a Tryal.

We propoſe, upon the whole, to lay before the young Huſbandman a uſeful Plan, and teach him to follow it with Spirit, and Diſcretion: to tell him how to purſue an Advantage, and where to ſtop: and, in this Manner, if any one be ignorant, to inſtruct him; and if any one be poor, who is willing to be induſtrious, to ſhew him the Way at once to enrich himſelf, and to oblige and ſerve his Landlord.

The AUTHORS.

A

COMPLEAT BODY OF HUSBANDRY.

BOOK I.

Of the SOIL.

In EIGHTEEN CHAPTERS.

The INTRODUCTION.

Treating of the Soil in general.

THE Soil is the Ground or Earth, in which the Farmer's Crop is to grow.

A pure Soil is a fine mellow Mould without any Mixture of other Matter; but this is found only in a few Places. All other Soils are compos'd of this Mould, with natural Additions of one or more less fertile Ingredients; such as Sands, Stones, Clay, and the like: and according as these are in a greater or lesser Quantity, the Soil is worse or better.

Some of these added Matters are also in their natural Qualities more pernicious than others: the Soil always takes its Name from them; and according to their Nature it is suited to particular Purposes: a sandy Soil doing best with some kind of Crops, a loamy with others; and in the same manner the rest.

The Soil thus mix'd by Nature is to be the first Article in the Farmer's Consideration; for on that will depend in a great Measure his Profits. It is easily examin'd; for often it shews it self on the Surface; and it is the first thing that appears on breaking up the Ground. It is thence call'd the underturf Earth; and also vegetable Earth, because it furnishes the needful Matter for the Growth of Vegetables, or Trees and Herbage of all Kinds.

Pure Mould is the lightest of those several Substances which compose the Earth, and therefore even with these Mixtures it naturally lies above

above the others. It covers them in ſome Places to a greater, and in others to a leſſer Depth: and the Matter by which it is debas'd is uſually of the Nature of the Layer which lies immediately under it; whether that be Sand, Gravel, Stone, Clay or whatſoever.

This Mixture of the Soil with the under Layer or Bed, is often made greater by the Careleſneſs of the Huſbandman, who cuts too deep with his Plow, and turns up a part of the next Matter with it: but it is almoſt always mix'd, in ſome Degree, even where the Plow or Spade never came. Moſt probably the rich Mould, when the World was firſt made, was ſpread every where in Purity over the ſeveral other Beds; but at Noah's Flood they were in part mix'd together: and hence the Land is leſs fruitful than it was at firſt.

When the Soil is pureſt, it is always richeſt: and it is known to be of this Nature, by its blackiſh Colour, and its mellow Softneſs. Pure Mould is tender and pliant; ſhort, and ready to crumble and moulder to Pieces, from which it has its Name; and it is alſo call'd the Heart of the Land; and Live Earth, in ſome Places, becauſe it is the Strength of the Ground, and the Suſtenance of Herbage.

It follows naturally, that in Proportion as this Heart of the Land is leſs mix'd with thoſe barren Subſtances, it will be more fruitful; and contrarywiſe, where it is more debas'd, it will have leſs Fertility. It is plain alſo, that in the former Caſe, it will need leſs Dreſſing, and Manure; and in the latter more: ſo that the ſame Condition which makes it unfruitful, renders it alſo expenſive.

Now altho' this Condition of the Soil be moſt ſurely diſcover'd by opening and examining the Ground; it may in ſome Meaſure be diſtinguiſh'd by the Surface, and by its Produce. We ſhall firſt therefore treat of thoſe Marks which are moſt obvious; and afterwards of the others, as they riſe in the Courſe of the Enquiry.

CHAP. I.

Of diſcovering the Nature of a Soil by the Situation and Surface.

THE Farmer naturally takes a View of the Land before he rents it; and even in this ſuperficial Examination he will make ſome Diſcoveries, from obſerving the Situation and the Surface.

In many Parts of England the Hills are in general more poor and barren; and the low Grounds more rich and fruitful; and this from a very natural Cauſe.

The fine Mould being light and looſe, is eaſily waſh'd from its ſtony or other Mixtures in the general Soil; and being carry'd off in ſome Degree from the hilly Parts, by the ſame Rains which ſeparate it, the Stony or other Remainder becomes ſo much the poorer. And from the ſame Cauſe, the Valleys are enrich'd beyond their natural Condition, becauſe the fine Earth, which is waſh'd from the Soil of the Hills, is carry'd to them.

This the Farmer in moſt Places experiences to his Coſt; the Crop being as much thinner on the Hills than in the Valley, as from his Labour and Expence he might otherwiſe expect it to be greater.

In ſome Places the Earth entirely wants this Soil, which is its proper Covering; and what ſhou'd in the Courſe of Nature be its lower Parts, lie naked. Thus Sand is ſeen upon the Surface of the Ground in ſome Counties, and naked Rocks upon the Hills in others. There is in theſe Caſes no Mixture of Mould with the former, nor any Coat of it over the latter; neither does there grow ſo much as Graſs to cover them. The Farmer is here at once a Judge of the Land: and may declare it to be of ſcarce any Value; for entire Sand can only be fitted for Huſbandry at a great Expence; and bare Rocks not at all.

In ſome Parts of England there alſo riſe here and there Banks of entire Clay, and others of hard and pure Chalk, up to the Surface of the Ground. The Clay is often in this Caſe almoſt as barren as the Rock: but a ſhort Graſs will grow upon the Chalk.

Of theſe four Caſes that of the Rock is the only one quite unconquerable; nothing can make that fruitful: the other three may be brought to produce tolerable Crops, according to the Methods hereafter to be deliver'd; but the Expence is ſometimes too great for the Produce, tho' the Rent be ever ſo little.

In all theſe Caſes the Huſbandman may diſtinguiſh the general Nature of the Soil by its Aſpect on the Surface; we ſhall ſhew, in a ſucceeding Chapter, how he may judge of it by its Produce.

CHAP. II.

Of judging of a Soil by its common Produce.

WHEN the Farmer has examined a Piece of Land according to its Situation and Surface, ſo far as the latter appears naked; he is next to obſerve carefully its natural Produce; and the State of the Crops that are upon it: from theſe he will be able to form a Judgment not only of its Condition as to Heart and Richneſs, but of the particular Nature of each Part; and to know the Qualities as well as Value of the Soil.

Where he ſees the Graſs, Corn, and other valuable Growths look ſtrong and healthy, it is a Proof that the Soil is either rich by Nature, or capable of being made ſo by Improvement; ſo that his future Pains beſtow'd upon it will not loſe their Reward.

Even the free Growth of Weeds (unleſs it be of ſome particular Kinds, as Fern, Ruſhes and the like, which betoken Barenneſs for better Things) is a Proof of Goodneſs in the Ground. Care will deſtroy theſe; and the ſame Heart in the Land which before ſupported them, will give Suſtenance to the Crop.

Let him examine well not only how liable the Soil is to be over-run with Weeds, but of what

what Nature and Kind they are which grow upon it: for as there are ſome which ſhew Barrenneſs, there are others which betoken Fertility. And altho' ſome of theſe wild Herbs are common to many Soils, yet the greater Part are ſo far peculiar to certain Kinds, that the Nature and Quality of the Land may be known by them.

That Sort of Fern, which is named in Books Female Fern, and which the common People call Brakes, is a ſure Token of Barrenneſs. Its common Place of growing is on Heaths. The other ordinary Kind of Fern which is ſmaller, and is called Male Fern, is of a different Nature; it ſhews that the Soil is in that Part ſuited to the Growth of Trees, and it flouriſhes moſt under their Shade.

In the ſame Manner Clods of Ruſhes and jointed Graſs, betoken a poor, damp, and as it is commonly expreſs'd, a ſour Land: but, in the Fen Countries, where a dark green ſhort Graſs grows among them; where the Ruſhes ſtand more diſpers'd, not in ſuch Bunches, and where there are ſeen ſome yellow ſhort flag Leaves among them, it may inform the Farmer, that there is Peat underneath. It is by this the experienced Tenant judges about WHITLESEA, and in other Parts of the ISLE of ELY; where I have known them offer a large Premium for a certain Liberty of digging Peat upon the Land they were about to take, and that without opening the Ground.

Theſe already named are the Weeds which moſt of all betoken Barrenneſs: many of thoſe, which will be ſpoken of hereafter, on the contrary ſhew the Land to have Strength and Richneſs.

There is the more Certainty in this Rule of Judging, becauſe the Weeds which grow on rich Lands, are in a manner peculiar to them. There is no Plant whatſoever that is found in a Clayey, among a Stoney, or on a Chalkey Soil, that is not alſo to be found in ſuch as are rich and valuable: But there are many Weeds which are the natural Produce of rich, and many which grow in the ſame Manner on light Soils, no one of which was ever ſeen either upon a Chalkey, Stoney, or a Clayey Land.

The Evidence Nature gives this Way, of the Qualities and Value of a Soil, is however liable to miſtake, unleſs heedfully attended. The Farmer muſt take Care that he form his Judgment, not by thoſe Weeds that grow equally on bad and in good Soils; but if he ſees a Plenty of ſuch as grow only on good ones, he may then be ſure the Land is rich.

If he ſee a great Quantity of Fumitory, a low Weed with divided Leaves and purple Flowers; if ſeveral of the Kinds of Orach, grow free and ſtrong; and in general, if ſuch Weeds as are found in the mellow Beds of a well cultivated Garden, ſpring up in Abundance on the Ground, he may be ſure the Soil is rich, fruitful and fine; for not one of theſe will ever grow free and ſtrong on a ſtarved, or in a cold clayey Ground.

When the ſees the Corn Marigold, which the Farmers call the Golding or Horſe Gold, in Abundance, he may be ſure the Soil is light and ſandy. It is a Land that will naturally bear Rye better than any other, but that may be brought to greater Value by Culture, and ſuited to every Species of Corn.

Where the Blewbottle is in great Plenty, and the Flowers are of a fine Colour, it ſhews the Soil is alſo light and looſe, but not without its natural Heart: this Weed and Cockle are a Proof of a light but good Soil, naturally fit for Barley and Wheat.

When the Flowers of the Blewbottle look pale and whitiſh, and the Herb itſelf grows meagre, it is a Sign of a ſtoney or chalkey Soil; or elſe that there is too much Sand in the Ground; for either of theſe Ingredients will occaſion that Change.

If there be a large Quantity of Wild Garlick, which is called in ſome Places Cow Garlick, among the Corn, it is a Token that the Land is of a clayey Nature. In HERTFORDSHIRE this Weed gets ſometimes into a ſtoney Ground, but that is not its natural Soil.

May-Weed, call'd alſo in ſome Places Wild Camomile, is in general a Mark of a loamy Soil; and the ſame Quality in the Land is ſhewn by the Wild Parſnip, which in BUCKINGHAMSHIRE and ſome of the neighbouring Counties they call Hog Weed and Swine Root. It is indeed the Parſnip not cultivated.

The Names of theſe and other Herbs, among the Country People, vary greatly. In ſome Places that of May Weed is given to Fumitory before mentioned; and the like Confuſion has been common with many others. It is therefore neceſſary to explain what is meant when they are uſed.

The Weeds which betoken a Soil altogether ſandy are generally low; and thoſe of a ſtony one, are commonly poor and ſtragling. Where there is a great deal of ſmall ſcabious, Rampion with ſcabious Heads, and the little wild Madder, the Farmer may be ſure there is too much Sand in the Ground: and when he ſees the ſmall Throatwort and the like, he may know it is ſtony.

In the ſame Manner a chalky Soil is diſcover'd by its ſtarv'd Appearance, by the Scarcity and Lowneſs of the Weeds, and by the natural Growth of the Baſe Rocket, and the like Plants, which are ſcarce in other Places. The yellow Stonecrop or Wall Pepper, ſo common on our old Walls, grows alſo on the Ground in theſe Places, particularly on the chalky Hills of KENT.

CHAP. III.

Of judging of a Soil by the Growth of Trees.

WHEN the Farmer has obſerved the particular Kinds of Weeds; and form'd from them, and from the external Appearance of the Land, a general Notion of its Nature and Value. Let him obſerve the Growth of the Trees; particularly of thoſe in the Hedge Rows.

If they be tall, ſtrait, full branched, and well headed, he may be ſure the Soil is, as the Huſbandmen ſay, good at Heart: on the contrary, where the Trees grow irregular, low, crooked,

or ſtubbed, 'tis a Proof ſomething is bad at bottom.

In this general Rule he is however, in the ſame Manner as in the former, to admit certain Cautions. He is not to expect every particular Tree he ſees to be of this fair Kind; for Accidents will injure ſome: nor is he to imagine every ſort of Tree muſt thrive equally, to ſhew the Strength of the Soil.

There are very good Lands on which ſome Kinds of Trees will grow fair and fine, while others do not anſwer ſo well: this is confirm'd by frequent Obſervation; and it may be generally explain'd from the Depth of the Soil, and the Nature of the next Layer under it.

I was ſome Years ago in NORTHAMPTONSHIRE, at a Town call'd BRAMPTON IN THE ASH, where I ſoon found what had been the Occaſion of the Name. The Aſh Tree grows thereabouts with a Freedom and Excellence not known any where beſide.

Theſe Trees are all about that Place tall, ſtrait, and of even Growth, ſo that their Appearance ſurpriz'd me: and on cutting them the Grain appear'd yet more beautiful. It was ſoft, regular and full, beyond any I have ſeen.

At CRANFORD, in the ſame County, the Aſh grows no better than in other Places, but the witch Elm is remarkable for its quick Shooting, and its Beauty. In the ſame Manner, the Elm in many Parts of BUCKINGHAMSHIRE, and the Beech in SUSSEX, ſucceed beyond all other Trees.

The judicious Huſbandman from this may take his Direction what Trees to plant in his Grounds, preferably to others; Nature giving him the Inſtruction: but of this we ſhall treat in its proper Place. Trees are mention'd here only to inſtruct the Farmer to judge of the Soil by their Growth, as well as by its other Produce; and to inform him not to judge only by the general, but even by particular Kinds in this Caſe; for where any one Species of the Trees in the Hedge Rows thrives particularly well, he may be ſure the Soil of the neighbouring Grounds has a Heart.

CHAP. IV.

Of the ſeveral Kinds of Soils.

WE have deſcribed in the Firſt Chapter what Vegetable Mould ſhou'd be when pure; and we have nam'd the ſeveral Kinds of Mixtures from the Underlayers of the Earth which render it leſs fruitful; ſuch as Stone, Clay, Sand, and the like: We come now to conſider the Soils as differently mix'd with theſe; and thence diſtinguiſh'd by particular Names.

There are Places, as already obſerv'd, where theſe ſeveral Subſtances, Stone, Clay and Sand, appear entire and unmix'd on the Surface of the Ground; but theſe, as there ſaid, are then barren: we are here to enquire into the Nature, not of theſe ſingly, but of thoſe Earths which are produced by a Mixture of one or other of them with the vegetable Mould. Theſe are what the Huſbandman calls Soils; and he names them according to the Subſtance which makes the Mixture. Thus they are called clayey, loamy, ſandy, ſtony, gravelly, or chalky Soils.

Theſe are their ſeveral general Names, by which they are known in all Counties, and which are Terms underſtood in all Places, becauſe they are founded in Reaſon, and upon Nature: but beſide theſe there are a great many others. To enumerate all wou'd be to make this Part of the Work a Dictionary, not a Syſtem: however, the principal ſhall not be omitted.

The fine rich mellow Soil is call'd in LINCOLNSHIRE Moory Land, becauſe it is the Soil of the Moors and Fens. It is dark and crumbly. A Soil of much the ſame kind in the higher Grounds of LEICESTERSHIRE and WARWICKSHIRE is call'd Hen Mould, it is dark colour'd, light and ſpungy. This, as well as the other, is better for Paſturage than for the Plow.

What they call Hen Mould in NORTHAMPTONSHIRE and HUNTINGDONSHIRE, differs from this entirely. It is a rich but firm Earth of a blackiſh Colour, with Streaks of white like Mouldineſs; and the more there is of this, the richer is the Soil. We ſee by this double Uſe of the ſame Word, how eaſy it is to confound one Thing with another in Huſbandry: the Farmer muſt be careful to avoid this, or he can have little Improvement from what he hears or reads.

The clayey Soils are diſtinguiſh'd in HERTFORDSHIRE and BUCKINGHAMSHIRE according to their Colours, into the red, yellow, white and black: but red Land in HUNTINGTONSHIRE means quite another Thing, as will be ſeen hereafter.

In NORTHAMPTONSHIRE there is a ſort of clayey Soil known by the Name of woodland Soil; becauſe it is the Sort of Earth on which the Woods uſually grow in that County. This is damp, tough, and ſad colour'd; it conſiſts of vegetable Earth with a large Mixture of black Clay; and there is always a Layer of ſound blackiſh Clay under it.

Sandy Soils are in moſt Counties diſtinguiſh'd alſo by their Colour; as the white, the yellow, and the red: but they have in ſome Places particular Names. All Soils have ſome Sand in them, even the richeſt: this may be ſeen by walking over them after a Shower of Rain: for tho' the earthy Part cover and conceal the Sand otherwiſe, yet the Showers waſhing it off, the Grains of Sand ſparkle and glitter at theſe Times.

A Soil is not however to be call'd ſandy becauſe there is a ſmall Quantity of Sand thus mix'd among it; 'tis only when the Sand is predominant, that it has this Name.

What is called a creachy Soil at COLLEYWESTON, and other Places in NORTHAMPTONSHIRE, is a ſandy Earth in which there are Bits of Stone, and Pieces of broken Shells that look as if they were calcin'd: as indeed they are by the Effects of the Sun and Air, and they tend greatly to improve the Land.

The Red Land as it is called about HALSTON, HASELBECH and ROWELL in the ſame County, is a ſandy Soil of a reddiſh Colour, with Pieces of a reddiſh Kind of Sand Stone among it, and ſometimes other Matters.

That

That which is called in LEICESTERSHIRE and WARWICKSHIRE a Kealy Soil, is a ſtoney Land; compos'd of a good Earth, with a great deal of Stone or Slate among it like the Chipings of a Maſon's Yard. This in many Places bears good Crops of Barley when the larger Stones are clear'd off.

Laſtly, what is called Chiſely Land in moſt of our midland Counties is a kind of Loamy Soil, often very fit for Wheat, Barley or Rye.

As the Eye may at Sight diſtinguiſh the general Nature and Value of a Land by its Produce: the Plough at once diſcovers the particular Nature of the Soil according to theſe Diſtinctions.

The Moory Soil turns up eaſy and free: its Colour and its Mellowneſs readily diſtinguiſh it. The Clayey Lands are hardeſt to cut, and hang in tough Clods. The Hen Mould that is ſtreaked ſhews itſelf when the Sod is firſt open'd, for it is rarely ſeen afterwards. The Sandy Soils turn up eaſily and regularly; and the Stony more unequally. The loamy when they are pure cut eaſy, and the chalky are always dry and hard. That particular Kind of the Loamy Soil called Chiſely, has its Name from its falling off the Plough in Pieces like the cutting of a Chiſſel: for it is one of the ſhorteſt of the loamy Kinds. It is not ſo looſe as the ſandy Soils, which fall off from the Irons like Bran or Saw-duſt; nor ſo tough as the Clay, that riſe in long Flakes; but breaks in ſmall Pieces. When a Land riſes in this Manner to the Plough, the Farmers in many Places ſay it brackles, and they look upon it to be a good Property.

CHAP. V.

Of Clayey Soils in general.

CLAYS, tho' diſtinguiſh'd according to their Colours, under the Terms of red, yellow, black and white, and called in particular Places under their different Appearances, by a Variety of Names, yet ALL agree in their general Nature, and may be conveniently firſt treated of together.

They differ from all other Soils in that they are tough, wet, and cold: and in Proportion as they are mixt in greater or leſſer Quantity in the Lands, they give them thoſe Properties in a greater or leſſer Degree.

Some of the Kinds are indeed ſo much tougher than the others, that an equal Mixture of them does more hurt. Thus the red Clays debaſe Lands more than any other Kind: the yellow are next in Stiffneſs and Coldneſs to theſe; the black are leſs wet and tough than either of the former; and the white leaſt of all. However, the yellow in a ſomewhat larger Proportion, will do equal Miſchief with the red in a ſmaller, and ſo of the reſt: the Difference as at firſt obſerv'd, being more in the Quantity of the Clay in the Soil, than according to the particular Kind.

The Improvement of all Soils depends in a great Meaſure upon the breaking them, by which Means their Parts are more expoſed to the Sun and Air, and are made more fit to receive the different Kinds of Seeds.

As the clayey Soils are of all others the moſt tough, they moſt of all require this Care. We know that the Effect of Fire is to reduce this tough Earth into a looſe crumbly Matter: And whatever Fire will do on theſe Occaſions, the Action of the Sun and Air will alſo perform, only it requires more Time. Oyſterſhells that have lain a great while on the Sea Shores, are as perfectly calcin'd by the Sun and Air, as if they had been in the Fire. And in the ſame Manner thoſe Shells which are found in Marle, and other Earths, when they have been a while ſpread upon the Ground, grow ſoft and crumbly. It is the ſame with Clay: the Sun and Air will take away its tough Quality, as the Fire does: and frequent Plowing meliorates clayey Soils, by turning up the Clods in different Poſitions to the Sun and Air, and by aſſiſting the Operation in breaking them to pieces.

This is the Way wherein frequent Plowing operates upon a clayey Soil, and the Farmer who tries it will never be deceived in his Expectations.

All Clay Lands are known by theſe Qualities. They hold the Water that falls on them; and when well wetted, they are a great while before they dry: in the ſame Manner when thoroughly dry, they are not ſoon wetted. In a dry Seaſon the Land cracks in Chinks. If it be plow'd when wet, it ſticks to the Plow like Mortar; and in a dry Seaſon the Plow tears it up in great hard Clods, which are all Clay at the Bottom. For this Reaſon where the Coat of Soil is not thick, the Farmer ſhould not plow deep, for he will then injure his Land by mixing the Clay among it.

All the clayey Soils require a great deal of Induſtry and Care, as well as Knowledge, in the Dreſſing and Management: but when the Toughneſs is got the better of, ſo that the Farmer can get his Grain into it, and ſee it well cover'd, it very often yields large Crops. The ſtiffeſt clayey Soil I have ever ſeen in ENGLAND, is about THRAPSTON in NORTHAMPTONSHIRE; and yet with the thorough Management they uſe there, it is one of the richeſt Lands in the Country.

Having thus treated of the clayey Soils in general, and ſhewn the great Neceſſity of their careful Culture, we ſhall proceed to examine them particularly, and deliver the ſeveral Methods which have been found moſt ſucceſsful in treating the ſeveral Kinds.

CHAP. VI.

Of red clayey Soils for Tillage.

THE reddiſh Clay, which gives the Colour and Name to theſe Soils, is the tougheſt and coldeſt of all the Kinds; and requires the moſt Pains in the Huſbandman to ſubdue its Nature.

It is frequent in its pure and entire State in the Counties of WARWICK, LEICESTER, YORK and NORTHAMPTON: they have alſo their Share of

of it in BUCKINGHAMSHIRE: in all theſe Places it is perceived plain enough in the Roads; which are ſtiff and deep in Winter, and are full of great Cracks in Summer.

It lies in the ſame Places under the Soil in all their Fields, and is in a greater or leſſer Degree mix'd with it every where thereabouts. The mix'd Soil over the Bed of pure Clay is generally of a conſiderable Thickneſs, which is very happy for the Farmer, as it gives him the Liberty of plowing deep, which this Land requires more than any other.

The firſt Method for the improving this Kind of Soil is, by frequently repeating theſe deep Plowings to break and ſeparate the Clods over and over, as the Sun and Air calcine them.

To this the Farmer is to add the Aſſiſtance of Dreſſings. And it is the particular Quality of this Clay, that it will receive all kinds of Manures, and be improved by them: but then the Labour is to be equal to the Expence, for without the frequent plowing already mention'd, nothing will take Effect upon it.

Dung does not readily mix with this Sort of Soil; but when it is well plow'd in, 'tis of great Service. This however is not the Kind that agrees beſt with it; in NORTHAMPTONSHIRE they manure it with Lime to ſome Advantage; in HERTFORDSHIRE and BUCKINGHAMSHIRE they uſe Soot and Aſhes; but that which agrees beſt of all with its Nature is Chalk. This is now the general Practice; and the Farmers in moſt Parts of ENGLAND begin to find the Advantages of it.

The young Huſbandman muſt not be diſhearten'd at the Expence of this Sort of Dreſſing, or the Labour of ſuch frequent Plowings; for he will be ſure to reap the Benefit of it: it is much more chargeable to dreſs a Piece of the red clayey Soil, than any other whatſoever; but then the Advantage laſts long in Proportion: a Field of this Soil, once well dreſſed, will keep in Heart fifteen or ſixteen Years.

Indeed it may be remarked of the clayey Soils in general; and moſt of all of this in particular, that altho' no Ground is ſo ſtubborn or ſo barren when neglected; none has ſo many or ſo great and good Qualities, when it has been thoroughly wrought in the above deſcribed Manner.

Perhaps it may be ſaid with Truth, that the more tough and ſtubborn theſe Soils are, the richer they prove when they are thoroughly ſubdu'd. Of this I ſhall give an Inſtance which has fallen within my own Knowledge.

There is near CAWCOTE in NORTHAMPTONSHIRE, a Piece of ſmall Extent, the moſt tough and untractable perhaps in that County, or in the whole Kingdom. This is indeed almoſt an entire duſky Clay. For a great many Years the Farmers all neglected it, and it produc'd almoſt nothing; at length about thirteen Years ago a young Man dreſs'd it thoroughly, and he ſoon found the Advantage; which continues to this Time. For with a moderate Care and Induſtry, it is now the richeſt Piece of Ground in the Country.

This is an Example the young Farmers in general ſhould thoroughly mind: not to be ſparing in Coſt, much leſs in Labour, upon a Sort of Land which never fails to return them the greateſt, and the moſt laſting Advantages.

When this Kind of Soil is redeſt, it is moſt clayey: where of a duſkyer Colour it frequently, tho' not always, has more of the right vegetable Earth among it. In the latter Caſe it yields the larger Crop with a little dreſſing; but when the former is well manag'd it greatly exceeds it: the Crops of this Soil may be properly called the Rewards of Induſtry.

The clayey Soils have their Advantages and Diſadvantages in reſpect of others with Regard to their Crops; and thoſe of the red Kind moſt of all, theſe being the moſt conſiderable.

In the firſt Place, the Crop upon a red clayey Soil is later in the Year before it arrives at its Perfection, than that which is ſown with the ſame Circumſtances upon a ſandy, or indeed on any other Land. It is from this the clayey Soil has obtain'd among the Farmers, the Name of the coldeſt of all Soils.

I have found alſo by frequent Obſervation, that theſe Soils are coldeſt of all where the Layer or Bed of pure Clay that lies under the Soil is thickeſt. This is known when Pits are open'd for this Clay for various Uſes, for which it is excellent, and which ſhall be enumerated hereafter. And where it runs very deep, the Harveſt is always naturally later in Proportion.

It is not a wonder that a Soil ſhould be very cold which is almoſt continually wet: a Piece of ſuch Land certainly is more affected by cold than ſuch as is dry; as we ſee by this that when a ſharp Froſt comes on at once in a dry Seaſon, it frequently does little Harm to the young Growths of the Garden or the Field; but Froſt after Rain is deſtructive.

The Damage by Froſt is not ſo immediate in a clayey Soil; but when it has taken hold it is more laſting. A ſlight Froſt does not penetrate Clay ſo quickly as it does other Earth: but when a clayey Soil is once harden'd by the Froſt, it remains longer hard than any other.

When this red clayey Soil is well wrought, Wheat ſucceeds excellently upon it. Barley ſometimes yields a good Crop, but not conſtantly, for it depends on the Seaſon; if that prove dry the Barley does well; but if not it comes to little: for this Soil holds the Water a great while, and Barley cannot bear a great deal of wet to lie about the Roots.

Beans ſucceed extreamly well in this Earth, for they will bear a great deal of Water, nay they require it: for in dry Seaſons and on a looſe Land, they yield nothing in Compariſon of their Produce on theſe Soils. Beans require a great deal of Nouriſhment, and this red clayey Soil is the richeſt feeding Land we have when well prepared.

It is not wonderful that proper Crops ſhould grow well upon a Land which holds ſo much Water: for we ſee that Mint, and many other Herbs, will grow in Water where there is no Earth at all.

Notwithſtanding the Advantages the red clayey Soil has over many others when carefully manur'd; yet there are Accidents alſo to which it is liable; and which are owing to its Original Nature,

Nature, of theſe I ſhall recount ſome few which I have ſeen.

If the Seaſon prove driping for a long Time together, and there fall a great deal of Rain in MAY, the Crop upon this Soil always ſuffers. The Beans bear it beſt: the Wheat becomes ſtunted and pale, and the Barley turns yellow, and if the Seaſon continue wet they don't well recover.

In a wet and froſty Spring, the Crops of Peaſe on this Soil are alſo apt to fail. The ſure Sign of this is the green Shoot turning red: and it is confirm'd by Experience, that in this Caſe it never recovers. Upon other Lands the Shoot will get this Caſt in a bad Seaſon; but when once it happens in a red clayey Soil all is loſt.

When this happens, it is beſt to know what one has to expect. As the Crop will never come to itſelf, the right Method is to plow it up at once, and ſow the Ground with Oats.

It was for the Reaſon of this Accident I did not mention Peaſe among the Crops that ſucceed beſt on this Soil. But beſide Wheat and Beans, as alſo frequently Barley, it is excellent for Clover; and no Land ſucceeds better with Turnips.

As to the Accidents I have mention'd as attending this Soil more than others, they are all owing to the Toughneſs of its Original Nature; and I have from many Years Experience, found that they happen always moſt in Proportion as it has been leaſt dreſs'd. I have obſerv'd before, that it is in itſelf a very bad Soil; but that it becomes very rich and profitable by being well manur'd. And if I may ſpeak what I have ſeen by my own Experience, it is that thoſe Accidents I have named, are all owing to the imperfect manuring of this Soil; for I have ſeen ſeveral Years that my Crops have all ſtood well upon a Field of this Nature, when my Neighbours loſt theirs, or they produced very little: and the only Cauſe of this was, that I ſpar'd neither Chalk nor Huſbandry; while they were frugal of both: and oftentimes my good Succeſs and their Loſs, have happen'd ſeveral Years after my laſt Chalking of the Ground.

My Advice therefore to the young Farmer, who has a Piece of Land with this Soil upon his Hands, is.

Firſt, not to ſpare either Labour or Expence upon it in the Beginning, for all this will be return'd to him ten-fold. Let him plow it thoroughly and often, and take Care that the Plow cut deep. Let him employ a careful and honeſt Plowman that will mind his Buſineſs, not an idle Boy, as is too often done. And let him go over the Land frequently himſelf to ſee that it is well cut up, and well broke in every Part.

In the ſecond Place, let him beſtow Chalk enough upon it, and ſee it be worked well in; or if Chalk cannot be had, let him uſe ſome of the other Manures juſt mention'd. When this is thoroughly done at firſt, common Care and Induſtry will ſerve afterwards: and from this he will have a Soil, which inſtead of holding the Water to chill his Crops while young, will let the wet when it is too much, below the Roots, and will always detain enough.

Thirdly, let him depend chiefly upon his Wheat: for that Grain upon a red clayey Soil thus manur'd, will never fail him. He may alſo be ſure of Beans, Turnips and Clover, for theſe never fail. He may in dry Seaſons ſtand a fair Chance for Barley: but Wheat is the ſure and certain Commodity for this Soil.

Laſtly, when he has thus got his Land into good Order by his Induſtry and Expence, don't let him drain it of its Heart again by Covetouſneſs or Folly. Let him not draw away its Strength by croſs croping, or too frequent ſowing. Moderation is the Rule of all Things in this Life. There is no Way to be poor ſo quickly, as the Deſire of growing rich too faſt.

CHAP. VII.

Of red clayey Soils for Paſturage.

THE Soil which is cover'd with a Turf, and that which has been many Years open'd by the Plow, will be found to differ a great deal when brought together, altho' they lie in adjoining Fields, and are in their Original altogether the ſame.

I remember about eight Years ſince to have been ſurpriz'd by this Obſervation in BUCKINGHAMSHIRE, but I have ſince repeated it with the ſame Succeſs in other Places; where the Earth has been to Appearance very different in a plow'd and a Paſture Ground, though only a Hedge parted them. I mention this Circumſtance that no Miſtake may happen in judging of this Soil, but that the Farmer may know it to be the ſame when he ſees it. In the BUCKINGHAMSHIRE Experiment, I took up a Piece of a red clayey Land from a Field not well manur'd, which was cloſe, hard, and high colour'd: after this cutting thro' the Turf, in an adjoining Paſture, I took up a Piece of the Soil there, which altho' rediſh and clayey, yet was leſs compact than the other, and of a darker Colour. The Cauſe of this is, that in Paſtures the Soil keeps more entire, and has its due natural Portion of vegetable Earth among it: whereas in plowed Lands, this is in a great Meaſure waſh'd away, and taken up by the Crops, ſo that the clayey Part remains more viſible.

When the Farmer therefore finds under the Turf in his Paſture, a Soil that is like that of his red clayey Lands, only ſomewhat darker and mellower, he may be aſſur'd that it is the ſame in its Nature; and would appear the ſame with the other after a little plowing.

This Soil when there is a due Proportion of vegetable Earth among it, is excellent for Paſturage. It has an unconquerable Heart, and the Produce is ſtrong. Where it is too near entire Clay, it muſt be aſſiſted by dreſſings.

I have obſerv'd throughout all BUCKINGHAMSHIRE, that where low Grounds have this red clayey Soil, they never fail to produce great Quantities of Graſs, and that excellent in its Kind, with little or no Manure. The Reaſon is, that the Rains bring down the light fine Earth from the higher Lands; and the Overflowings of the Rivers leave their fine Mud upon them, whence they are render'd fertile in a ſurprizing Manner.

This may be a Leſſon to the Farmer, that the beſt of all Manure for this Soil in Paſture Grounds, is the Mud taken from the Bottom of Waters. Nature is the beſt of all Inſtructors. This is the Practice every where in BUCKINGHAMSHIRE: They drag up the Mud from the Bottoms of their little Rivulets, and it enriches their Paſtures that have this Soil in a ſurprizing Manner.

The Reaſon why this red clayey Soil receives more good from the Waſhings of the Hills, the Fall of Rains, and Overflowings of Waters in Paſturage than any other Kind, is, that it retains the fine vegetable Earth which is brought upon it; the fineſt Part of which gets through the others. Thus its Toughneſs is an Advantage.

Even pure Rain Water as it falls from the Clouds, contains a great deal of this vegetable Earth, as it may be prov'd by Experiments. Now when this falls upon a looſe Soil, the Water paſſes through, and this pure Earth, which is the true Nouriſhment of Vegetables with it: but when it falls upon this tough Soil, or is otherwiſe brought upon it, the Water is detain'd a great while, and this fine Earth with it; and the Earth is kept when the Water has by Degrees got through. So that all which comes is preſerv'd for the Benefit of the Herbage.

This is the Reaſon why Paſtures that have a red clayey Soil are always fruitful, in whatſoever Situation; but moſt when they lie low: as Experience in all the Counties where I have been confirms.

What they call Woodland in NORTHAMPTONSHIRE, which, as before obſerv'd, is a red clayey Soil, tho' in ſome Places render'd duſky by Accidents, is alſo very fruitful in Paſturage.

I don't wonder therefore, that in many Parts of the laſt named County, the Farmers have a great while prefer'd the Paſture to the Corn Lands in a great many Places; and that large Quantities of what was heretofore Tillage Ground, is encloſed and converted into Paſture. For the red clayey Soil is very frequent there; and this requires a great deal of Labour and Expence in Tillage, but very little for Paſturage: there is alſo a great deal of Hazard in the former Way, as obſerv'd already concerning the Crops of Barley and of Peaſe: whereas when it is laid down to Paſturage, there is no Hazard at all.

But altho' I do not wonder at this Cuſtom among the former NORTHAMPTONSHIRE Farmers, yet the carrying it too far is a Practice not to be commended. For there ſhould always be a Proportion preſerv'd between the Paſture and Tillage Land; that the Dung of one be enough to ſupply the other. Of this I ſhall ſpeak more largely in its Place: it is only hinted here, leſt haſty Youths ſhould ſeize on the Expedient of converting Arable Land to Paſturage, without ſeeing Conſequences.

For Proof of what I have advanced, that there are few Soils better than the red clayey Land for Paſturage, I ſhall obſerve, that the fineſt and richeſt Knot of Paſtures I have ever met with, lies about the Point where the Counties of LEICESTER, WARWICK and NORTHAMPTON meet, particularly in the Lordſhips of ASHLEY, ELTINGTON and THURNLEY; and in all theſe the Soil is a red clayey one, only render'd duſky by the greater Mixture of vegetable Mould, as it has been obſerv'd already there always is in Paſtures.

I have thus endeavour'd to ſhew the young Farmer the Nature of this Soil in Paſtures, and its Value: as alſo to give him the Reaſons of it: becauſe I know when Things are underſtood, they are better remember'd.

The Advice I have to give him is this. Not to be too haſty in making Changes from Tillage Land to Paſture, or from Paſture to Tillage, becauſe a great deal is to be conſider'd: let him in general leave Things as they are in this Reſpect; at leaſt till he has very well weigh'd them. Let him ſee that he keep up the Proportion between his Arable and Paſture: and let him not be haſty to lay down plow'd Lands into Paſture, to ſave Expence and prevent Hazard; nor on the other Hand, to turn up good Paſtures for Corn Land, for the Sake of the firſt Crop. That will probably indeed be good, becauſe of the Quantity of fine Earth originally in the Soil; but when this is exhauſted, he ſees at what an Expence of Labour and Manure, he muſt ſupply its Place; for the Soil is ſoon drain'd of this its natural Richneſs, and without the Aſſiſtance of Art afterwards will do little. There may be Occaſions of making theſe Changes to Advantage, but let it never be done haſtily. There can never be more Room for Conſideration.

CHAP. VIII.

Of red clayey Soils for Trees.

THE Planting of Trees, and the Manure of Paſtures, are Subjects to be treated of hereafter in their Places: we are here only conſidering the Nature of particular Kinds of Soil, and they are nam'd barely to ſhew how they ſuit them.

Now the Conſideration of Land, in reſpect of Trees, muſt be carry'd deeper than the Soil. This Term I have ſhewn takes in no more than the upper Covering of the Earth: but Trees ſtrike their Roots deeper, and there ſeek their Nouriſhment.

However, as this Soil generally runs thicker than moſt others, and as it commonly has a Bed of the ſame red Clay under it, of which it principally conſiſts; it is proper in this Work, wherein nothing is intended to be omitted that is uſeful, to conſider the Soil in this Reſpect.

All Trees do not equally agree when young with all Soils, as is plain from Experience; nor do they thrive equally, when more grown, upon all Lands. This may be explain'd in the firſt Reſpect from the Richneſs, or the Poorneſs of the Soil or upper Earth itſelf: and in the latter, from its Bottom. Some Trees pierce deep into the Ground with their Roots, others ſpread them far and wide, under the Surface, at a ſmall Depth: of the firſt kind is the Oak, and the Aſh is of the latter. The Aſh therefore may do in a Place where there is ſome little depth of good

good Earth, and the under Layer is Rock, but the Oak cannot.

This familiar Inſtance may ſhew, in what reſpect this red clayey Soil is fit for Trees; and in what it is not: we ſee plainly it is good for ſome Kinds, and not for others.

The Aſh grows well at BRAMPTON in NORTHAMPTONSHIRE, becauſe the Soil is light and rich; but in ELTINTON Hundred, in the ſame County, where the Paſture is alſo rich, the Aſh does not thrive at all, the Soil being of this clayey Kind. On the other hand, the Oak grows beautifully in the latter Place, which in the other fares but indifferently.

The red clayey Soil therefore is excellent for the Oak, but not well for Aſh. And in general, from the ſame Reaſon, it will ſucceed with all thoſe Trees which have Tap Roots, that is, long ſingle Roots which pierce deep into the Ground; and but indifferently with thoſe which have ſhallow and ſpreading Roots, that ſtretch under the Surface. Which Trees belong to each of theſe Claſſes will be ſhewn hereafter.

The ſhallow rooted Trees ſucceed beſt where there is a richer upper Coat; but the deep rooted ones find Advantage where the under Layer is ſuch as they can penetrate, and is capable of affording ſome Nouriſhment.

One Advantage of the red clayey Soil for Trees is, that whatever Kind once takes in it will continue to thrive; whereas in others, there is often a promiſing Appearance at firſt, and they die off afterwards; and if the Growth be ſlower in this coarſe Soil than it is in ſome finer, the Timber is always firmer, ſounder, and better in its Kind.

The Trees which ſtand well upon this Soil always grow ſtrait and lofty, becauſe of the Depth of the Ground; whereas thoſe which ſhoot apace, from their ſtanding in a rich Soil with a bad Bottom, grow ſtubby afterwards, ſpreading their Tops inſtead of riſing to a height.

Thoſe Trees which ſuit this Land alſo may be planted ſafely in Places where others cannot, for they never hurt any thing that is ſown in the adjoining Land. Trees which ſpread their Roots ſtarve the Growths that are near them; but theſe draw their Nouriſhment from greater Depths, and conſequently hurt nothing.

Without therefore entering farther in this Place into Subjects that muſt be treated at large elſewhere, my Advice to the Farmer is, that when he is to plant upon this Soil, he look about the Grounds, and ſee what Trees thrive beſt, and ſelect thoſe Sorts for his Purpoſe. And he may account it one of the Advantages attending this Land, that it is not hurt by the Trees which are planted in it; as all others more or leſs are.

CHAP. IX.

Of yellow clayey Soils for Tillage.

THE yellow Clay of ENGLAND is in its Nature more nearly ally'd to the red than any other: and is next to that the moſt frequent. It is as univerſal in ſome Counties, as the red is in others; and is ſo much of the ſame Compoſition, that a great many of the Rules laid down in the preceding Chapters hold true here: but as Chalk is the beſt Manure for that, Marle, where a proper Kind can be had, is for this.

In this Place it is neceſſary to caution the Farmer, that he rightly and exactly underſtand what is meant by a yellow clayey Soil: and particularly, that he obſerve the Difference between that and yellow Loam, to be deſcribed hereafter in its Place: otherwiſe he may hurt himſelf by the moſt ſtrict Obſervance of our Rules, by employing his Manures upon a wrong Soil.

Yellow Loam is a mix'd Earth, compos'd of Clay and a great deal of Sand, with very little of any other Matter. But the yellow clayey Soil is a Mixture of yellow Clay with a greater or leſſer Portion of vegetable Earth, reſembling greatly the red clayey Soil, except in Colour, and having no other Sand in it than the general ſmall Quantity which is found in almoſt all Soils.

The yellow Loam, as will be ſhewn more fully hereafter, is crumbly: the yellow clayey Soil is tough. One breaks off in little Parcels from the Plow; the other riſes in long tough Flakes.

After having thus diſtinguiſh'd exactly what the yellow clayey Soil, of which I am about to treat, is, I ſhall conſider it as the other, with reſpect to Tillage, in the preſent Chapter; and as it is concern'd in Paſturage and the Growth of Trees, in the two ſucceeding. My Deſire is, that the Farmer ſhou'd perfectly underſtand his Soil, before he enters on any other Part of his Profeſſion, for it is the Foundation of all.

The yellow Clay, of which this Soil principally conſiſts, is oftener found pure and entire than the red: and when it is ſo, its Toughneſs in wet Weather, and its flinty Hardneſs in dry, render it very difficultly manag'd.

In the clayey Soil of this Colour there is mix'd more or leſs of mellow Earth with the Clay; and accordingly it is more or leſs fruitful in the firſt Tillage; and requires greater or leſſer Expence in dreſſing afterwards.

The ſtiffer this Soil is, the more barren it is; and the more brittle the more fruitful: for Reaſons given already. It is moſt ſtiff where there is the leaſt Mixture of Earth with the Clay; and, in Conſequence, it is the moſt fruitful, where the Mixture of Earth is largeſt.

This is ſeen in Nature, and this Art is to imitate, where the Mixture of Earth was not originally enough in Quantity; or where it has been waſh'd away by Rains, or drawn off by frequent Crops, for they conſume it; the Want is to be ſupply'd by ſome Manure which will break its Stiffneſs; or by the Plow, the Air and Sun which calcine it till it is crumbly: both theſe join'd together render it laſtingly fertile.

What in many Places they call Hazel Mould, is a Mixture of yellow Clay, with more or leſs of a blackiſh mellow Earth. This makes the beſt Soil, that is naturally form'd of the yellow Clay; and is excellent for Wheat and Rye: it will alſo bear other Crops well, but theſe two beſt.

The Improvement of the common yellow clayey Soil, which is in its own Nature much poorer than the hazel Mould juſt mention'd, is to be begun by frequent and deep Plowings. When the Clods are by this Means broke, and the Matter render'd leſs crumbly, the Manures are to be apply'd. I have found by Experience, that this Soil takes Manure better than the red; and I have diſcover'd by repeated Trials, that nothing is better for it than Chalk. Marle alſo is excellent, as will be ſhewn hereafter. Aſhes, Soot, and even Sand, are uſeful alſo; and Dung, after the firſt Dreſſings, will mix well with it.

In Oxfordshire they mix Chalk and Aſhes to great Advantage.

In Staffordshire, where this Soil is frequent in the common Fields, they ſow it two Years, and let it lie fallow the third. They lay it in Ridges, or otherwiſe, according to the Condition; and make their Fallows toward the latter End of March. They plow it a ſecond Time about three Months after, or a little ſooner; and before this, they dreſs it with Cow-dung or Horſe-dung, except when they fold it with Sheep, then it is immediately ſpread and caſt under Furrow with the Plow, before the Sun and Rain exhauſt and weaken it. Ten Weeks after this, that is toward the End of Auguſt, they plow it again to kill the Weeds; and to turn up the Manure. About the Week before Michaelmas they plow for ſowing, and then the Manure is again turn'd and falls upon the Seed with the fineſt Part of the Land.

They ſow Wheat upon the Land after this Dreſſing, and afterwards Beans, with both which the yellow clayey Soil excellently agrees after this Preparation. This is the Staffordshire Practice in common Fields.

When they have the ſame Soil in their encloſed Grounds, they manure it with a light kind of Marle. If they ſhould put a clayey Marle upon this Land, it would be only adding Stiffneſs to Stiffneſs; but they have a greyiſh Kind in that County, which crumbles after the leaſt Rain, and this they uſe for theſe Purpoſes: with this dreſſing it will yield good Graſs after eight or nine Crops.

Now tho' this Practice be not altogether the beſt that can be us'd, we ſee the Effect it takes; and therefore much may be gather'd from it.

They plow it four Times for Wheat. This, with the Effect of the Air breaks, and makes it looſe and crumbly. The Rains then ſoak into it, inſtead of lying upon it, or running off without Benefit, and leave behind them the fine Earth they contain.

The ſame Purpoſe is forwarded alſo by their laying it in Ridges, becauſe more of it is in that Situation expoſed to the Air and Rain. After this, once plowing does for Beans, becauſe the Earth is already improv'd by theſe repeated Plowings; and becauſe Beans do not require ſo fine an Earth to cover them as Corn.

The Farmer ſeeing Things in this Light, will underſtand the Reaſons of his Succeſs, or Failure in every Article; and will be enabled to improve his Lands, and enrich himſelf, upon the Principles of Reaſon.

He will ſee the great Diſadvantage of the common Field Management, and the great Benefit of the Dreſſing given in the Encloſures in the ſtrongeſt Light. In the firſt Method every third Year is loſt. Nor is that all, but they loſe a great deal of the Advantage of the ſecond Year: For in the other Way, a good Huſbandman after his Crop of Beans, Peaſe, Oats, or Barley, has a Crop of Turneps or of Clover.

Inſtead of this great Loſs, the enclos'd Land of the ſame Kind manur'd with the grey Marle, yields eight or ten Years Crops ſucceſſively; and at the End of the Plowing when it is laid, to gain freſh Heart, it yields good Graſs, and no Time at all is loſt. Nor is it really neceſſary to let it lie ſtill at all, for if they keep marling it conſtantly, they may plow conſtantly: the Dreſſing ſupplying Nouriſhment for a new Crop, as ſoon as the old one has exhauſted the former.

Upon the whole of what has been ſaid of the Management of this, as well as the other clayey Soils, my Advice to the young Farmer is, that he conſider if he have an encloſed Field of this Soil in his Hands, what Kind of Manure he can beſt command, and at leaſt Expence: for this is a Conſideration that will weigh againſt any other.

Let him begin by plowing deep and often; and let him lay up the Land in Ridges, obſerving to place the Ridges Eaſt and Weſt, that the Sun may have fuller Effect on them.

If there be Marle in the Neighbourhood, let him examine whether it be fit for the improving of Clay in this Manner. Firſt of all let him examine it in his Hand, if it be firm and heavy, it is not fit. The lighter always the better for this Purpoſe. Then let him throw a Piece of it into a Bowl of Water; if it begin preſently to crumble to Pieces of itſelf, and in a ſhort Time fall to a kind of Powder, it is fit for the Purpoſe; but if it continue in a Lump, and the Water have little Effect on it, 'tis not for his Uſe for this Kind of Soil. I ſhall ſpeak more largely of Manures hereafter, ſo this may ſuffice for the preſent Occaſion.

If he have a proper Marle at Hand, let him lay it on in Plenty for the firſt Dreſſing; and repeat it in moderate Quantities afterwards: If Marle of the right Sort be not in the Way, let him uſe Chalk. This does not take ſo quick an Effect, becauſe it does not get into the Body of the Clay ſo ſoon, but the Expence and Labour are very well repaid, becauſe the Benefit is as laſting nearly in this, as it is in the red clayey Soil.

If the firſt Manure be Marle, he may continue the ſame without any Addition; but if Chalk, he will do well to give the Aſſiſtance of other lighter Manures occaſionally. Saw-duſt, when it can be had in Quantities, is a very great Promoter of Fertility in this Land. It acts in the ſame Manner as the decay'd Stalks of Plants, than which nothing is richer.

In ſome Places where other Manure cannot be had, Sea Sand may be uſed for the Improvement of the yellow clayey Soil; and it is to be laid on in very large Quantities: this may ſeem ſtrange Advice to the Farmer in ſome Counties, where ſuch a Thing was never heard of, for every Thing appears ſtrange at firſt; but it is

a Practice founded on Reaſon: the Cauſe of the particular Barrenneſs of theſe clayey Soils, is the Toughneſs of their Subſtance; and Sand breaks that Toughneſs, and gives Way for the Rains to get into their Body. Farther Loams are fruitful, as will be ſeen hereafter; and as the practical Farmer well knows Loams are only Mixtures of Clay and Sand. Nature has made the Mixture in theſe Places, and why may not Art and Induſtry imitate her.

By large dreſſings of Sand, a clayey Soil may be turn'd into a loamy one for ever; and then an Addition of ſuch Manures as we ſhall afterwards order for Loams is uſeful. Nor is it a wonder that Sand ſhould in this Manner meliorate Clay Ground; for Clay is us'd in the ſame Way as a Manure to Sand, of which more hereafter; and in that Caſe it does the ſame Thing.

Aſhes which are a very good Manure for yellow clayey Lands, act in a double Way, both as Sand, and by their other Qualities; warming, as well as opening the Land: and after the more ſubſtantial Dreſſings, Soot is an excellent Manure. Nor is burning to be forgot for the Improvement either of this, or of the red clayey Soil, for it breaks their Parts in a ſurprizing Manner, rendering them not only fruitful in themſelves, but converting them into a Manure for other Lands.

CHAP. X.

Of yellow clayey Soils for Paſturage.

I Have obſerv'd of the red clayey Soils, that they are very rich in Graſs when they lie low, becauſe they retain the Advantage brought them by Waters. But Experience ſhews this is not ſo much the Caſe in the yellow, for when they are in a low Situation, they are too damp for any good Produce.

The Reaſon of this I take to be, that their Subſtance is more compact than the red, and they do not let in that fine Earth which comes with Rain or otherwiſe, and which mellows and enriches the red clayey Soils in this Situation.

For a Proof of this I have obſerv'd upon examining, that the yellow clayey Soil contains leſs of the vegetable Earth in general in its Mixture than the red: that is, it comes nearer to entire Clay. A Piece of this Soil taken from under the Turf in a Paſture, is ſeldom richer than a Piece taken from a plow'd Ground of the ſame Soil. From theſe Obſervations, I believe, we may fairly judge, that the yellow clayey Soil is for the Generality, much poorer than the red. And this is the Reaſon Marle is ſo excellent a Manure for the yellow clayey Soil, becauſe it diſſolves into ſo fine a Subſtance, that it mixes with the Clay, and ſerves in the Place of that Earth, which Nature has deny'd in the Compoſition: breaking the tough Texture of the Soil, and leting in Rains.

But tho' low Grounds that have a yellow clayey Soil, do not uſually produce ſo good Graſs as thoſe of a red: yet this Kind is upon an Equality with the other when it lies dry. This is a very common Soil in the high Paſtures in BEDFORDSHIRE, and the Graſs is excellent.

As the Soil may be judged of in general by its natural Growth, ſo it may alſo with great Juſtice in particular Places. It is always a Mark of good Paſture Ground, that a great Quantity of Cowſlips naturally grow there; and there is no Soil that produces ſo many or ſo ſtrong as this: nor is it apt to be over-run with Weeds, except Thiſtles, which are known to be the natural Produce of all Soils that are clayey, and have a good Heart.

The Farmers in BEDFORDSHIRE obſerve, that it is always a good Paſture to feed Cows upon, where there are Abundance of Cowſlips, and I have obſerv'd in many other Counties, that there is no Paſturage ſo well agrees with that Animal, as where the Ground is of this yellow clayey Kind.

The greateſt Diſadvantage of theſe Paſtures, eſpecially when they are on the Slope of a hilly Ground, is, they are apt to be moiſt in Winter. In WARWICKSHIRE they prevent this by diging many deep Trenches thro' them. Theſe receive the wet and carry it off by Degrees, as may be known by the continual dribling at their Openings. By this Means they keep the Paſture Ground, though of this Soil, ſufficiently dry at all Seaſons.

It is always good in Paſtures to have a firm Bottom that will detain ſome Moiſture; and this is one Reaſon why the Paſtures on a yellow clayey Soil are good: for they have uſually a pure yellow Clay for the under Layer, and that is one of the firmeſt of Earths.

A Paſture that has a yellow clayey Soil, and that lies high, will need frequent feeding or mending, whereas thoſe in a lower Situation, are dreſs'd by Nature, as obſerv'd before: but then the Hay of the beſt low Lands, is not to be compar'd with that of theſe higher Grounds.

I have obſerv'd in many Inſtances, that the fineſt Hay I have ever ſeen, has come off of high Grounds, where there has been a yellow clayey Soil.

My Advice to the Farmer is, that he always examine the Earth in his Paſturage; and that he never fear to take an upland Paſture Ground, if this be the Soil; though it appear but in bad Heart: for he may be ſure there is what is right at Bottom, and he may improve it at Pleaſure.

In this, as all other Inſtances, I adviſe him not to ſpare Manure or Labour. The Money that is ſaved that Way is loſt ten-fold.

The beſt Manure for the upland Paſtures of this Soil, is Dung mix'd with Mud from the Bottoms of Rivers, or the cleanings of Ditches. He ſhould lay on this at ſuch a Time, that the Rain will waſh its Richneſs in before the Sun evaporate it: and he cannot ſpread it too fine in ſuch a Seaſon.

The fineſt Manure of all for this Ground, when it can be had, is the Bottom of old Hayſtacks. There is always there a fine rich Mould; and the Quantity of Hayſeed among it is no ſmall Advantage; for it ſows the Ground afreſh, and comes up with all the Strength of the Manure.

In STAFFORDSHIRE, where the low Paſtures

are often of this Soil, they manure them with Marle, and it excellently anſwers their Purpoſe: for even where the Mud brought by the Overflowing of a River, would only lie upon the Surface to be baked by the Sun; the Marle will make its Way into the very Heart of the Soil.

CHAP. XI.

Of yellow clayey Soils for Trees.

THIS is not a Soil in which Trees ſhoot quick, but there is a Soundneſs and Heart in it that gives them a great deal of Strength.

I have obſerv'd, that the Nature of this Soil approaches very nearly to entire Clay: and it is known by all Experience, that no Tree whatſoever thrives well in entire Clay. This is not the Soil therefore on which Plantations are to be made for the Advantage of the Wood.

There is alſo this Reaſon againſt the Farmer's planting on the yellow clayey Soil, that the Growth of the Tree is ſurprizingly ſlow. It is a Remark of Mr. EVELYN's, That Trees growing on this Ground, require thrice the Time to come to their Stature: and this Experience confirms; for we ſee Trees keep many Years almoſt of the ſame Bigneſs on this Soil: and as for ſuch as are large, it is hard to know when they were planted.

Neither is this yellow clayey Soil any fitter for the Orchard than the Foreſt. Fruit Trees grow as ill in it as Timber Trees: and it even alters the Quality of the Fruit. It is known by manifold Experience, that Apples of the ſame Kind have a quite different Flavour, when the Trees ſtand in a good light Soil, from what they have in this yellow Clay.

Another great Diſadvantage of the yellow Clay for Fruit Trees is, that the Trees which grow in it are found to be much more liable to be over-run with Moſs, than thoſe on better Soils: and every one who has at all conſider'd the Products of the Orchard, knows how great a Diſadvantage this Foulneſs is to Fruit Trees of all Kinds.

The Farmer therefore who has Land with this Soil on his Hands, knows from this what to expect from them. They will anſwer exceeding well with proper Care, in plowed Fields and Paſture: but he is to remember not to make Orchards or Plantations upon them.

If he ſee large Timber upon the Ground, particularly if it be Oak, he need not fear bargaining upon that Head, if it come within his Deſign; for 'tis more likely to be ſound than on any other. Oaks on this Soil are very tedious, but they are very firm.

This Soil is alſo fit enough for the raiſing Seedling Trees, which are to be tranſplanted to another. For, as they never thrive well when removed from a better Soil to a poorer: ſo they on the contrary ſucceed to Admiration, when they are taken from a Soil of this Kind into good Mould.

Thus we ſee from repeated Experience, that altho' the red and the yellow Clay agree in many Reſpects; yet there are ſeveral others in which they are entirely different. And this is the Uſe of collecting Obſervations from different Places and Perſons.

Altho' theſe two Soils are ſo like in many Reſpects, the two which follow, namely, the black and the white Clay differ from them almoſt in all. So that he who talks of a clayey Soil, unleſs he expreſſes the Colour, ſays nothing. In general, however, when that Expreſſion, a clayey Soil is uſed without any farther Particulars, it means a red or a yellow.

CHAP. XII.

Of the white clayey Soil.

EVELYN obſerves, that among Clays ſome are ſo obſtinate, that nothing will ſubdue, and others ſo voracious, that nothing will ſatiate them. Of the firſt Kind are the two former, the red and yellow; of the other, the two ſucceeding, the white and black, but principally the white; the black in ſome Places approaching to the Nature of the others.

Now as I have ſhewn in what Manner the moſt ſtubborn of the former Kinds, may be ſubdued either for Tillage or Paſture: I ſhall here from the ſame Foundation of Experience, inſtruct the Farmer how he may ſatiate and fill theſe others, whoſe hungry Nature has ſeem'd to many not to be conquer'd.

It has been affirm'd by ſome practical Writers who have examin'd theſe Things nicely, that Clay contains about a fourth Part of fine Sand. HOUGHTON, among others, has affirm'd this, and brought the Proof of it from his own Experiments. But 'tis only of the red and yellow Clays this ſhould be affirm'd. The white Clay contains none: nor would be difficult to produce the yellow Clay altogether pure from it. Indeed there always is ſome in the red, and this is a Reaſon why the red clayey Soil is not quite ſo ſtubborn as the yellow.

It is ſtrange, that among Soils of the ſame Name, contrary Methods are to be uſed in the Culture; but this is the Caſe between the red and yellow clayey Soils, and the white: it is to be obſerv'd, however, as before hinted, that theſe really agree in nothing but the Name of Clay, their Qualities being altogether different.

The Farmer is to obſerve an exact contrary Conduct with the white clayey Soil, from that proper for thoſe before-mention'd; for his Aim is to be juſt oppoſite: his Care with the others is to make them fine enough: but when he has a white clayey Soil to manage, he muſt take Care he does not make it too fine.

As the red and yellow clayey Soils are tough and ſtiff; the white is tender and brittle: it breaks as it falls from the Plow: and from its Nature in this Reſpect, it yields to the Plow with great Eaſe.

Frequent Plowings were order'd for the others, but a few do for this. As no Soil requires ſo much Care in the Manures, the Farmer's Attention is to be employ'd almoſt entirely on that Head. In general, as the yellow and red clayey

Soils require ſtrong, this white one requires rich Dreſſings.

In the firſt Place, the fineſt Manure for it is Soot. This they practiſe in HERTFORDSHIRE, where they have much of this Land, with great Succeſs: and had Mr. EVELYN, who ſays nothing will ſatiate theſe voracious Clays, ſeen the Effect of this Manure, he would have alter'd the Expreſſion.

Soot may ſeem at firſt Sight a dear Manure; but a little of it goes a great way. Experience ſhews that one Buſhel of Soot is equal in its Effects to a Load of common Dung.

Eighteen Buſhels of good Soot will compleatly dreſs an Acre of the white clayey Land; and the ſame Quantity of Ground, as is very well known, will take as many Cart Loads or more of good Dung. But let the Farmer take Care he is not impoſed upon in this LONDON Commodity: For the Chimney Sweepers are apt to mix Aſhes among their Soot to encreaſe the Quantity; and then it may require five and twenty Buſhels to an Acre.

The only way is to deal with reputable Perſons: and, to ſpeak from Experience, I have found Mr. FAT of Caſtle-ſtreet, who is the King's Sweeper, one that never impoſed upon the Farmer, nor let his Servants impoſe upon him.

After Soot, the next Manure for this Soil is Dung. And in this Reſpect, the Farmer will find that the Practice of folding upon it is excellent. ELLIS recommends the folding firſt; and afterwards ſpreading it all over with the Dung: and this is found to be of great Service.

Turf and Dung alſo ſuit excellently well with this white clayey Soil: but they ſhould lie to be mellow'd together for a great while.

The white clayey Soil when dreſs'd in this Manner, never fails to yield very large Crops. I have very ſeldom known the Price of Manure not anſwer when it has been of a proper Kind; but there is none that brings home the Money ſo ſure, as that which is beſtow'd on a Soil of this Kind: for it is but indifferent Land in its own Nature, but with this Culture it ſcarce yields to any.

This is not a common, nor a profitable Paſture Soil, nor for the Growth of Trees. I ſhall not, therefore, treat of it in diſtinct Chapters under thoſe Heads; but proceed to the next and laſt of the Clay Kinds.

CHAP. XIII.

Of the black clayey Soil.

HAVING conſider'd the red, yellow, and white clayey Soils, I come now to the black, which is the richeſt of them all.

The other Kinds may be brought to Fertility by Art, and with Experience, but this enjoys from Nature the ſame Advantages. The Mixture in this Soil is ſo happy, that it is in its own native State, much like what they are when improved by Culture. Yet even this is capable of great Improvement, inſomuch that it will yield twice the Produce in the Hands of the ſkilful and induſtrious, that it does to the inconſiderate or ignorant.

This black clayey Soil conſiſts like the others of a blackiſh Clay, which is mix'd with a Quantity of vegetable Mould; and alſo contains Sand, ſometimes in a very large, uſually in a moderate Quantity.

The Clay in the Compoſition of this, is not ſo tough as that of the red or yellow, as appears when they are examin'd ſingly; nor yet is it ſo ſhort and crumbly as the white. Thus its own Nature tends to its making a better Soil than either; and then the Sand which it contains anſwers the Purpoſe of that which in other Caſes is to be added; and the Quantity of vegetable Mould gives it great Fertility.

Such is the Compoſition of this excellent Soil; which is in reſpect to its Structure and Conſiſtence, of a middle Nature between the white clayey Soil, and the yellow or red; and exceeds them both in Fruitfulneſs.

This Soil therefore does not require thoſe painful or repeated Plowings, nor that Expence and Tedioufneſs of Manure which are neceſſary to the others: but light Turnings and rich Manures applied in ſmall Quantities, anſwer the Purpoſe. Theſe muſt be uſed according to Knowledge, and as there is no Land ſo well worth the ſtudying as this, there is none that will ſo well reward the Pains.

The Varieties of this Land are called in different Parts of ENGLAND by different Names. In HERTFORDSHIRE, where they are more careful about the Culture of their Land than the naming it, they are all called by one Term black Clay; and the ſame Methods are taken with them.

In HUNTINGTONSHIRE they have three Kinds of them, to which they give different Names; they call one White Land, another Black Land, and the third Wood Land.

One would think by the Name White Land, this Kind belong'd to another Place: but, in Reality, it has little Title to the Name, it is very nearly allied to their Black Land. When wet, this looks as dark as that does; and when dry, the black itſelf becomes greyiſh. The greateſt Difference in Colour is when both are thoroughly wet, and new turn'd up with the Plow. What they call White Land appears then greyiſh; and the other very dark: but they differ more eſſentially in their Natures.

The Black Land is more clayey than the other, and conſequently requires more Manure; and is much inferior to the black clayey Soil in other Counties. It ſticks to the Plow when plow'd in a wet Seaſon, and has all the Marks of a clayey Soil. They manure this with Marle; and where that is not to be had with Chalk.

This may be an Inſtruction to the Farmer, to diſtinguiſh one clayey Soil of a blackiſh Hue from another; and to treat the worſe Kind properly when he meets with it.

The White Land of this and the neighbouring Counties, for it is common in them, and called by the ſame Name, is truly of the black clayey Kind, it is dark enough when wet, and falls off the Plow-ſhare eaſily, breaking into ſmall Clods.

Clods. This is a very rich Land; and is to be treated as the beſt Sort of this Soil.

The Wood Land of this County is nearer the ordinary black clayey Soil of Hertfordshire, and other Places, than any other. I have already named a Soil called Wood Land in ſome Parts of Northamptonshire, which is rather of the Nature of the red clayey Soils: but they have alſo in that County a kind of Wood Land, in particular about Pychely, which is truly of the Nature of the Huntingtonshire Wood Land, and as rich. They have alſo the black and white Lands, and they call them by the ſame Names.

Having thus explain'd what is meant by the different Names under which the black clayey Soil is expreſs'd in different Places, I come to treat of its general Nature, which is ſoft, mellow and crumbly; breaking in the leaſt Froſt.

This Soil is richer in Hertfordshire than in any other Part of England I have ſeen: it is there pure and unmixed. On the contrary in Northamptonshire, it is always ſomewhat ſtoney; but then the Stones are ſmall; and they are of Uſe rather than Detriment, eſpecially where this Soil is not of the firmeſt Kind, for they break and open it, giving Room for the Rains, and for the Shooting of the Seed.

Too much wet is an Enemy to this Land; therefore thoſe Fields which have this Soil, and lie ſomewhat high, are the moſt profitable: but the Generality of it is found in lower Places.

This Soil neither requires ſo much Plowing as the red and yellow Kinds: nor will it do with ſo little as the white. Moderate Plowing is beſt: but when it lies low, I would adviſe the Farmer to plow it with a Foot Plow, only one Way, in broad Lands, laying it in half Acre Pieces as high as may be, for this is the Way to avoid the Hurt that will enſue from its being too wet; as it is very apt to be in theſe low Grounds.

The Farmer who ſhould go to dreſs this Soil like the other clayey Kinds, with Chalk and Sand, and the like, would be guilty of a ſtrange Error. Mellow Dung is the proper Manure for this Land; and adds to its natural Richneſs. Cow Dung is not amiſs for it, but the beſt Manure of all is the Dung of Pigeons. Where this is to be had, the Way of uſing it is thus. It is to be ſprinkled over a Barley Field for Inſtance by Hand, as ſoon as the Barley is ſown. In this Caſe the Rains waſh it in, and the Effect of it is ſurprizing. Nothing can exceed the Crop that follows ſuch Dreſſing on ſuch Land.

The Dung of Poultry is alſo good uſed in the ſame Way; and any rich and mellow Manure.

This black clayey Soil in Paſture Land is very fruitful, and needs leſs dreſſing than any other; the beſt Manure is Dung, that has lain till it is well rotted: this is to be carefully ſpread over the Ground, that the Rain may waſh it in: and for this Purpoſe it ſhould be laid on in a rainy Seaſon.

Trees of many Kinds proſper very well in this Soil; and no where better than in Northamptonshire, where not only the Soil itſelf; but the thick Bed of Clay that lies under it, is intermixed with ſmall Stones.

When the Clay at bottom is more pure, it is liable to the Objections of being too cloſe, and holding the wet, which chills the Roots of ſome Trees to their Deſtruction: but when there are theſe Stones among it, they make it in ſome Meaſure looſe, that it lets the Water drain out; and gives Paſſage to the ſmall Roots.

CHAP. XIV.

Of loamey Soils.

TREATING of the clayey Soils, we have led the practical Farmer thro' a great Variety of Kinds; each of which it was of the greateſt Importance to him to underſtand. There remain yet five other Sorts of Soil to be treated of. But theſe will be comprehended in a ſmaller Compaſs, none of them having that Variety.

Among theſe thoſe of the loamy Claſs naturally follow the Clays, becauſe they in a great Degree partake of the ſame Subſtances, altho' from the Proportions of the Mixture, they differ in their Nature.

We have ſeen that a clayey Soil is no other than Clay mixed with ſome Quantity of vegetable Mould.

Loam is a Mixture of Clay and Sand: the Sand being in a large Proportion.

A loamy Soil therefore, is a Mixture of Clay, Sand, and ſome vegetable Earth: or it is a Loam, ſuch as before deſcribed, with ſome vegetable Earth among it.

We have ſeen that in what are called clayey Soils, there is uſually a little Sand, but this need not make Confuſion. The Character of Loam is, that there is a great deal of Sand mixed with the Clay; and there is alſo in theſe Soils uſually a great Quantity of Earth.

The loamy Soils are more common than any other: they differ in Colour according to the Clays, and the Earths of which they are compos'd; and they differ alſo in Richneſs and Fertility, according to the Quantity of vegetable Earth in the Compoſition. Even pure Loam is not unfit for Uſe, for the Sand opens and breaks the Clay, ſo as to render it fit for Vegetation; as we ſee in thoſe Places where Sand is us'd upon Clay Grounds, by way of Manure; but when a conſiderable Quantity of vegetable Earth is added to this Mixture, it becomes very fit for the Product of Herbage; the Clay ſerving to give it a Body, and keep the other Ingredients from mouldering into Powder.

Loamy Soils are of all others the moſt natural, becauſe theſe Mixtures of different Earths together, are what may be expected every where: and they agree with almoſt all Kinds of Growths, becauſe they are of a middle Nature, and in ſome Degree partake of all Soils.

They have for this Reaſon been in general called by ſome natural Soil, and by others mother Earth. As all Plants receive their Nouriſhment from the Earth; according as that Earth is ſuited to them, they thrive more or leſs: now, tho' a loamy Soil will naturally ſupport almoſt any Produce of the Ground, yet all will not thrive alike in it. The Art of the Huſbandman therefore muſt be employ'd by proper Manures to

ſuit the loamy Soil in his Hands to that particular Crop he deſires ſhould grow upon it; and this may be done effectually.

We ſee by Experience, that Clay and clayey Grounds keep in the Seed a long Time, and puſh it ſlowly; on the contrary, ſandy Soils make it ſhoot at once, and forward it haſtily. The ſame Seed ſown in Clay and Sand, ſhall be a Month earlier in the ſhoot in the latter than the former. We ſee alſo, that this Backwardneſs of the Soil, and this over-haſtening Quality, are both attended with bad Conſequences: and it follows, that loamy Soils muſt be very valuable as they partake of each, and are in their Compoſition, and alſo in their Effects, of a middle Nature between both.

We ſee that loamy Soils are ſuited to univerſal Uſe, in that all Kind of wild Plants grow in them. There are ſome Plants which grow naturally in Clay, and others which live in ſandy Soils. Now the Plants which are Natives of the Clay, will not live in the Sand; nor will thoſe of the Sand live in Clay: but both will live and thrive in Loam.

From this and many other Obſervations, we ſee that the loamy Soil is univerſal; and that all Sorts of Plants will grow in it. This muſt greatly encourage the Farmer who has it in his Fields, but this is not to lead him to think it will do without his Induſtry. There is Difference between growing and thriving. Things muſt not only live but thrive with the Farmer, and to this Purpoſe he muſt aſſiſt and improve his Land when this is the Soil. 'Tis a Comfort that Nature has laid a Foundation; but the reſt muſt come from his Induſtry.

Loamy Soils have many different Appearances. Some call the under-turf Earth, Loam, let it be of what Nature it will, and then the Variety is endleſs; but without that Miſtake, the Kinds are very numerous.

In HERTFORDSHIRE, and the adjoining Counties, they diſtinguiſh theſe Soils into five Kinds. Theſe are Clay Loams, Sandy Loams, Gravelly Loams, Stony Loams, and Chalkey Loams: what they mean by theſe Terms is as follows.

The Clay Loam is a loamy Soil in which there is an over Proportion of the Clay to the reſt of the Ingredients; for theſe Soils, as ſaid before, are all of a very mixed Kind. The ſandy Loam is a loamy Soil, in which the Sand is in too great a Quantity: the gravelly Loam is a loamy Soil, with ſmall Pebbles among it; and ſo of the other two, the one having Stones, the other chalkey Matter among it.

The Farmer is to conſider each of theſe as a loamy Soil in the general Dreſſing; but he is to alter that a little in each alſo; by adding what is elſewhere deſcribed as uſeful for improving that particular Soil, which is over-proportion'd in the Loam. For Inſtance, if it be a clayey Loam, he is to add to the uſual Dreſſings for loamy Soils, a Quantity of Sand. This will make up the natural Deficiency. And in the like Manner he is to manage the others.

In many Parts of NORTHAMPTONSHIRE, particularly about OUNDLE, they have a Sort of Earth which they call Lamb Earth. This is a loamy Soil, and I believe the Name Lamb Earth is only a fooliſh way of ſpeaking Loam Earth. It is a Loam with a great Quantity of ſtony Matter among it. This would have been called a ſtony Loam in HERTFORDSHIRE, as ſhewn already: although it differs in many Reſpects, from all the Earths in that County.

It is hard and whitiſh, and beſide the Bits of Stone that are in it, 'tis full of broken Sea Shells. In ſome Places it is the under-turf Soil, and in others it lies beneath that. When it is uppermoſt, they dreſs it with Dung, and the Mud out of Ditches: where it lies under the Soil, they plow deep to turn it up among that; and breaking by Degrees with the Sun and Rain, it ſerves as an excellent Manure to the reſt.

In KENT they dreſs their clayey Loams with Chalk; and this is found by Experience, to be an excellent Method. I have myſelf examin'd many of the Lands that have been for ſome Years dreſs'd at proper Times in this Manner; and have found that the Chalk in time mellows down into the clayey Matter, ſo as to make in the whole a kind of Marle.

I have ſeen Lands there not only made very fruitful in themſelves by this Practice, but the Soil of them might have been us'd as Manure for others.

We ſee that among the Clays ſome are ſo tough, they will not receive Manure, others ſo hungry, they hardly ever are ſatiated; and Sand which takes it readily, yet lets it go again ſo ſoon, that the Farmer has not the Advantage of his Expence or Labour: but loamy Soils have none of theſe Inconveniencies. In the firſt Place, they are in themſelves fruitful: then they are looſe enough in their Texture to let in Manure; and have Firmneſs enough to keep it.

In ſhort, a loamy Soil, where it is not from its Situation too dry or too wet, is an Eſtate to the intelligent and induſtrious Farmer.

With Reſpect to the Manner of its Dreſſings, he is more to regard the Texture of the Soil, than its Colour: which laſt may be various, while the Subſtance is in a Manner the ſame.

If it be a clayey Loam, that is, a loamy Soil with too much of the Clay, let it be well plow'd, and broke thoroughly: then dreſs it with a Mixture of burnt Turf from a Heath, mixed with Lime and Hog's Dung. This Receipt I obtain'd from a Farmer in OXFORDSHIRE, who kept it as a Secret, and was envy'd by all his Neighbours. In BUCKINGHAMSHIRE they dreſs the ſame Soil with a Mixture of Cow Dung, ſharp Sand, and Aſhes of Fuzzes from the Commons, and I have ſeen it ſucceed well, but not equal to the former Method.

When the loamy Soil is too ſandy, Clay may be us'd as a Manure; and at other Times River Mud mix'd with Dung and rotted Turfs: this alſo I have ſeen practis'd very ſucceſsfully.

When the loamy Soil is in its own Nature well mix'd, and no Ingredient over-bears the reſt, Dung in the common Way of uſing ſerves to refreſh it after it has been exhauſted by Crops: and as the Effect of this is but ſhort, the experienced Farmers plow in Horn-ſhavings bought in LONDON, together with Hoofs and Skins of any Animals. Theſe not only give

great Strength and Heart to the Land, but their Effect is very laſting.

When there is too much Earth in the loamy Soil, the beſt of all Manures is Soot. This laid on in a moderate Quantity, gives that Soil the only Thing it wants, which is Warmth. This Sort of Land receives the Manure kindly, and requires moderate plowing.

When the loamy Soil has Stones in Abundance, whether they be of the Lime Stone or Pebble Kinds. And whether it be called a gravelly or a ſtoney Loam, the vegetable Earth being deficient, good mellow dunging is the Way. In this Caſe, I adviſe the Farmer to bring out all the Dung from his Yard, Horſe Dung, Hog, Cow, and Poultry Dung, and mixing it with Mud from the Bottoms of Rivers or cleanſings of Ditches, make it into a Heap in the Field. When he has a good Hill of this Mixture, let him cover it with freſh cut Turf, and leave it to mellow together.

When he is to ſpread this on the Ground, let him take a fit Seaſon: not lay it on in the midſt of Summer, for the Sun or Air to waſte its Strength, but toward Autumn, when the ſucceeding Rains will waſh it into the Ground. Thus will he make a Soil that is but unfruitful in itſelf, very rich; for theſe poor ſtony Loams, tho' barren in their own Nature, receive the Dreſſings kindly, and are thus made very fruitful.

In ſome Parts of Surry, they have a very ſtiff clayey Loam, which they treat as follows. After a Fallow they ſow two Crops; and lay down their Lands with Clover for three Years. At the End of this Time they dung it richly, and then it is fertile for ſeveral Years again.

In Hertfordshire they plow in Clover alone, or with Dung; and ſome ſow and plow in Buck Wheat; both which Methods have their Advantage, but they are not comparable to ſeveral of thoſe before mention'd.

I have treated the more largely of the loamy Soil, becauſe it is the moſt frequent, and is very various in its Kinds. Nothing concerns the Farmer ſo highly, as to underſtand its ſeveral Natures, and the proper Management for each; which I have deliver'd from the Experience of ſeveral Perſons in different Counties, ſelecting from a great Quantity of Obſervations in this Way, what ſeems to be confirmed by the moſt frequent Trials. Loam is thus made to ſuit all Sorts of Crops; and is in its own Nature, very friendly to Graſs and Trees of all Kinds.

CHAP. XV.

Of ſandy Soils.

THERE are ſome Parts of this Kingdom in which the Covering of the Earth is for large Tracts together a bare Sand. Theſe are barren, for not only the Winds diſturb the Surface continually, and prevent the rooting of Plants (except a few ſtubborn Weeds that will grow in dry Sand, as others will on naked Rocks) but Sand alone can afford very little Nouriſhment to them: at the ſame Time that it burns up their Roots.

This Sand where it is thus the uppermoſt Covering of the Earth, muſt be called the Soil in thoſe Places; but this is not what the Farmer is to underſtand in general by a ſandy Soil. When we ſpeak practically, we mean by that Name a Soil in which Sand is predominant, altho' there be ſeveral other Earths in the Mixture. From this great Quantity of Sand, theſe Soils are all looſe and crumbly. This is the great Article of their Diſtinction: for that Soil I have already deſcribed, under the Name of a ſandy Loam, is not called a ſandy but a loamy Soil, becauſe the Clay that is in it, notwithſtanding the great Quantity of Sand, holds it together ſo that it is not crumbly or looſe.

The ſandy Soils are in the ſame Manner as thoſe of other Kinds, diſtinguiſh'd into ſeveral Sorts according to their Colours. The three principal are the red, the yellow, and the white ſandy Soil. There is alſo a brown, but this is leſs regarded, and is very barren. It is moſt common on Heaths, and conſiſts almoſt entirely of Sand alone, the Sand which compoſes it is white, but it gets this brown Caſt from a barren browniſh Mould, which lies under the Heath and Furze Roots.

The other Kinds have their Colours moſtly from the Sand in their Compoſition, the three principal Colours of Sand being red, yellow, and white: but ſometimes the Earths in their Compoſition, prevail in Colour.

Beſide the ſandy Soils called by that Name, there are others known by various Denominations in different Counties. As for Inſtance, what are called red Land, and creachy Land in Northamptonshire, are both ſandy Soils; and ſo is the chiſely Land, of the ſame County, tho' ſome call it a Loam.

To theſe is to be added, what in Buckinghamshire they call the black ſandy Soil, and in Hertfordshire the black Sand. This might have been comprehended under the general Head already mentioned of ſandy Soils, to which the other Ingredients give the Colour; for it is not a black Sand that is the principal Ingredient in this Soil, but the Mould amongſt it gives the black Colour to the whole, though the Sand be whitiſh. I have, however, named this Kind ſeparately, becauſe it is much ſpoken of in ſome Places.

The ſandy Soils in general are of their own Nature barren; but they are capable of great Improvement in the Hands of the judicious Farmer. Any Crop whatſoever will be ſooner burnt up in this than in any other Soil whatever naturally; but with proper Dreſſing it ſupports them very well; this the induſtrious Farmer finds to his joyful Experience.

As theſe Soils are dryer, ſo they are warmer than any other: and very happily for the Huſbandman, they keep their good Qualities after the Dreſſing, though they part with their bad ones. Thus the natural good Quality of ſandy Soils, is to puſh any Crop very forward; but then their natural bad Quality is, that they ſoon after ſuffer it to be burnt up: now after due Dreſſings, they will preſerve their Crop, as already obſerved,

ſerved, as well as other Lands; but at the ſame Time they keep their natural forcing Quality ſo well under all theſe Dreſſings, that the Farmer if he manage well, may have two or three Crops from them in a Year.

Another Advantage of ſandy Soils is this, that of all others they are the leaſt productive of Weeds: and what they have on them are in general of the ſmaller Kinds; and eaſily deſtroyed. We ſee all Soils that are at all fit for Culture, have their Advantages peculiar to themſelves; and there is none of them, but with due Management, will prove advantageous.

It is a farther Advantage of this Land, that it works eaſily under the Inſtruments of Huſbandry of all Kinds, and freely receives Dreſſings. The rediſh ſandy Soils generally require moſt Manure, the black leaſt; the other two are in general about on an Equality.

No Soils receive Moiſture ſo readily as ſandy ones, but they are the leaſt the better for it of any, becauſe as they eaſily let it in, ſo they freely let it out again. The Rains that fall on clayey Soils, frequently do not penetrate into them; and thoſe that moiſten the ſandy, do not ſtay in them; unleſs there be a firm Layer underneath.

The moſt common Layer under a ſandy Soil, is ſtony or gravelly, and this lets the Water thro' as faſt as the Sand itſelf; ſo that the Farmer's Truſt muſt be in his Manure, to give a Firmneſs and Body to the Soil, that it may of itſelf retain Moiſture enough for the Service of the Crop.

The creachy Soil in Huntington and Northamptonshire, which is one of the blackiſh Kinds, and is full of Pieces of Stone, and Bits of Sea Shells, as before obſerv'd, is manur'd with Dung well rotted. And to this the moſt expert Farmers add Mud from the Ditches, or they cut good Turfs, and put them to rot among the Dung, and ſpread all together before Rains.

The red Land of the ſame Counties, owes its Colour to a rediſh Sand, of which it is principally compos'd. There is a Mixture of very fine Earth with it, but there are alſo Lumps of concreted Sand, which they call Sand Stones: theſe when they break with the Rains, and Tillage debaſe it, while the Farmer is improving it by his Manure. In ſome Places the vegetable Earth is mixed with the Sand in a moderate Quantity, in ſome others, as about Halston, 'tis almoſt entire Sand.

The Farmer in general may learn from the Practice of theſe Counties, how he is to treat ſuch Soils. Where the Soil is pooreſt in this Kind, it is generally deepeſt: and as it works eaſily, they plow it deep, and bury in it old Rags, and the Skins of Animals with their Hoofs, and any other ſuch warm Matter; after this they ſpread their Dung, firſt mixing with it Mud out of the Ditches. Thus they give it Warmth at the Heart, and at the ſame Time a Body and Richneſs nearer the Surface.

When this Land is ſo very ſandy, I ſhou'd adviſe the Dreſſing it with Clay. This wou'd make it a loamy Soil. We know the Value of thoſe Soils, and we know they conſiſt of Sand, Mould, and Clay. Here are the Sand, and more or leſs Mould ready, there wants only the Clay; which will freely enough incorporate with it, and make it ſufficiently firm.

The chiſely Land, as they call it in our midland Counties, altho' ſome account it a loamy, is more truly a ſandy Soil. It breaks as it falls from the Plow; and moulders with the leaſt Froſt: ſo that it has little of a clayey or loamy Nature. In dry Summers alſo it is always a Powder. This is far from one of the worſt of the ſandy Soils. They dreſs it with Dung alone, and it yields excellent Crops.

Upon the whole, I ſhould propoſe a Mixture of Soils for all theſe ſandy Lands. They want Body or Firmneſs; and this may be given them by Clay, or by richer Earths, ſpread over them by way of Manure. This would be following Nature's Courſe, and mixing up Ingredients as ſhe does. This Method might be called making, rather than improving a Soil.

The ſandy Soils in a wet Seaſon, proſper greatly with Wheat, Barley, or Oats: but as this Succeſs depends on the Weather, the Huſbandman who runs the Hazard, unleſs he have very well improved them, muſt take his Chance. The fineſt and beſt taſted Turneps are thoſe which grow on theſe Soils. And they are not only well flavour'd but ſound: Worms and other Inſects which deſtroy them, love a moiſt Earth where they can burrow, and lie at eaſe: they are burnt up in theſe Soils.

Potatoes are very ſucceſsful in ſandy Soils; and it is well known that none are ſo fit for Carrots: Peaſe, Vetches, and Lentils, alſo thrive in theſe Soils exceedingly. And ſo do the foreign Graſſes, Saintfoin and Lucerne, which are Natives of warmer and drier Countries than ours.

In the great Reſpect of Corn, as before obſerved, the Farmer's Succeſs will altogether depend upon his Induſtry; for, though no Soils ſtand more in need of Improvement, they never fail to return the Expence beſtowed on them tenfold.

For Paſture Grounds, a ſandy Soil ſucceeds in Proportion to the Degree of vegetable Earth that is among it: the poor red Land of Rowell, and other Places in Northamptonshire, yields very ſweet Graſs; but not a great deal of it, except in Proportion as it is improved by Manures: but when there is a due Mixture of Earth, and the Farmer adds his Dreſſings of rich Dung, Mud, and the like, none ſucceeds more to his Expectations. I believe ſome of the fineſt Paſtures in the World, are to be ſeen in Oxfordshire, and the Soil is generally a yellow ſandy one, but with a good large Proportion of vegetable Earth; and the Farmers keep it warm by frequent Dreſſings.

In Worcestershire they have this Soil frequent in Paſture Grounds, and on opening the Earth, there is found to be a Layer of Gravel underneath. They have ſweet and fine Graſs here, and it grows moderately full; but in dry Seaſons it burns up: however, it quickly recovers itſelf on the leaſt Rain. They dreſs it here with Dung in a coarſe Way: if they were more careful in that Reſpect, they would have a much larger Produce.

In

In Lancashire they have a ſandy Soil of a particular Kind; they call it Foxglove Earth. It is a tender brown Soil, full of a ſharp Sand, and with little other Mixture than a fine vegetable Mould. This affords them very good Paſtures. In general the Graſs is ſweeteſt that grows on theſe Soils.

With reſpect of Trees, the ſandy Soil is not greatly to be prais'd for the larger Growths. The Beech ſucceeds beſt in it. And the Hazel, the Holly, and ſome others of the Shrub Claſs, will hardly thrive in any other; for the reſt it wants Body. There is neither Firmneſs in it to give good Hold to their Roots, Richneſs to ſupply them with Nouriſhment, nor Cloſeneſs to hold Water. It may be proper enough to raiſe Seedlings which are to be tranſplanted to richer Soils; but otherwiſe it is of little Uſe in that Way.

CHAP. XVI.

Of gravelly and ſtony Soils.

IN this, as in the foregoing Chapters, it is neceſſary to premiſe, that there is a great Difference between what is called a gravelly Soil, and a Bed of Gravel.

Gravel is very frequent at ſmall Depths in the Earth, and ſometimes it is ſeen in the ſame Manner at the Surface: that is, naked, and without any Mixture of Earth. What is called Gravel, is a Cluſter or Quantity of Flints and Pebbles. Theſe, when they happen to make the upper Surface of the Earth, lie in the Place of a Soil, tho' they cannot be called a Soil properly. They can afford no Nouriſhment for Plants, nor do any grow wild among them, except upon the Sea Shore ſome few that have Roots ſo long they penetrate into the Ground underneath, thro' a Foot or two Depth of theſe looſe Stones.

Such a Covering of the Earth therefore, compos'd of Numbers of Flints and Pebbles alone, is Gravel: but, as in the former Caſes, a gravelly Soil is a Compoſition of Mould, Sand, Clay, or ſome other Subſtance with this Gravel.

The Soil thus compos'd, is diſtinguiſh'd into ſeveral Kinds, according to the Nature of the Earthy, or other Matter that is mixed with it; and hence the Farmers name theſe different Kinds, clayey Gravels, loamy Gravels, or ſandy Gravels: they might add another Sort, to be called marly Gravels; for I have obſerv'd in Huntingtonshire, a Soil compoſed of a ſandy Marle and Gravel, with no other Admixture. This turn'd to little Account in the Hand of the Farmer who rented the Land, for he did not know how to dreſs it. The Rains waſh'd down the Marle to the Bottom of the Bed, within a few Weeks after every Plowing, and the Gravel remain'd in a Manner naked; but I am convinced had he dreſs'd this Land with a clayey Loam by way of Manure, it would have given it a Body: the Marle would have blended with the Dreſſing; and they would together have made a Bed capable to hold the Pebbles. Thus a new Kind of Soil would have been made, not unlike what they call a ſtony Loam in ſome Counties, which I have ſeen very fruitful.

I give this Advice to the Farmer, who ſhall have a gravelly Soil of this Kind upon his Hands, from Reaſon and Opinion, not from Experience, or any Thing I have ſeen; but I do not queſtion it would prove ſucceſsful.

As theſe Soils conſiſt of Gravel and earthy Matter, they are in general better or worſe, as that earthy Part is in a greater or leſſer Proportion. There is ſomething in the Kind of Earth, but the Gravel is in itſelf ſo entirely barren, that the great Article of Difference lies in the Proportion.

When gravelly Soils are very poor, it is almoſt vain to try to improve them. When they have any tolerable Mixture of Mould, it will help to detain the Manure, be it what it will; but when there is very little, the Dreſſings be what they will, waſh through them. The Farmers are in many Places ſo ſenſible of this, that they let ſuch Lands lie idle.

In ſome Places the Gravel in theſe Soils, conſiſts wholly of ſmooth round Pebbles, and in others there is a Mixture of irregular Stones among them. In many Places alſo, there are Lands in which the Soil is compos'd altogether of theſe irregular Stones and Mould, without a ſingle Pebble or Flint among them. Through Careleſſneſs this is called alſo a gravelly Soil, tho' it ought to be called a ſtony Soil, theſe ſtony Lumps being broken Pieces of Lime Stone, or other rocky Stones.

This is a much better Soil than the other, becauſe there is a Warmth in the Nature of Lime Stone; and becauſe being of an uneven Shape, they mix better with the Mould, and remain more firmly in it than the Pebbles, whoſe Roundneſs and Smoothneſs makes them liable to fall out continually.

The Soil called in Bedfordshire, and the neighbouring Counties, kealy Land, is of this Kind; and it is tolerably fertile. Barley ſucceeds very well upon it. They manure it with common Dung, and it receives and retains that Dreſſing very well, always keeping its Condition tho' very full of Stones.

The clayey Gravels are a tough and diſagreeable Soil. The Pebbles break the Subſtance of the Clay, and give way for the Rains to come in, and for the Roots of Plants to penetrate, but there wants a Mixture of Earth for the Foundation and Support of the Growth.

Theſe are beſt manur'd with Marle, but a right Kind is to be choſen. It muſt be the light brittle Marle that moulders to Powder in Water. The larger Stones ſhould be pick'd off theſe Lands, and this Dreſſing repeated at convenient Times, and with this Aſſiſtance few Soils exceed it in Fertility.

Loamy Gravels are in their Nature preferable greatly to the former; they are a Mixture of Clay, Sand, fine Earth, and Pebbles: the larger Stones are to be pick'd off from theſe, and the Land is to be dreſs'd in the ſame Manner as the poorer Sort of loamy Soils, as has been ſhewn already.

The ſandy Gravels when they are beſt, are but very indifferent Soils, that is, when there

is the greateſt Proportion of the fine Earth mixed with the Sand and the Pebbles; but when they are poor in their Kind, they are hardly worth cultivating, for the Rain waſhes the Sand down among the Pebbles, and the Manure with it; and the Soil gets into the Condition of a native and naked Gravel, ſuch as has been before mention'd.

If the Farmer have ſuch Land upon his Hands, or chuſe to meddle with it, he muſt propoſe to be at a great deal of Expence, before he can expect any conſiderable Return. The only reaſonable Way of going about an Improvement, is firſt to make a Loam of it, and then to enrich it with Dung and other Materials.

This is the View he muſt have in his Work, and to this Purpoſe he muſt begin by dreſſing it with Clay. This he muſt take Care to incorporate well with the Sand and Pebbles, and when he has made it as it were a different Soil by theſe Means, he muſt dung it well, for now it will hold the Manure; or if Marle can be had, that will be an excellent Dreſſing.

By this Means he will bring it to be fruitful, but this is a Work of Time, and by his Labour, he rather makes a new Soil than improves the former.

In Oxfordshire they have ſandy Gravels with a very ſmall Mixture of Earth, ſo that they hardly ſtand the Effect of heavy Showers, which make them often look at the Top like a bare Gravel.

When the Oxfordshire Farmer undertakes a Piece of Ground of this Kind, if he find it in this naked Condition, and without ſo much as Graſs upon it; the firſt Thing he does, he folds his Sheep upon it in Winter, and ſprinkles it with Hay-ſeed among the Dung. If the folding be not ſufficient, he adds ſome freſh Dung, or old Straw or Thatch: or ſometimes without folding at all, he ſpreads ſome common Dung, or the Bottom of an old Hay-ſtack: in this latter Caſe, he truſts to the Hay-ſeed that is fallen from the Stack, but if it be only Dung, he uſes to ſprinkle Hay-ſeed with it, that there may be Graſs as well as Nouriſhment for it.

They always find that if theſe Sort of Lands have no Sward upon them before they are fallow'd, they will bear a great Quantity of Weeds, but a very ſlender Crop of Corn.

They fallow in Autumn or Winter as the Sward directs them. If it be a Winter following, they never ſtir it again till they plow it up to ſow it with Barley, and Experience ſhews, as I have frequently ſeen, that this Practice does better than finer Tilling. After this they muſt be kept well in Heart with Manure, but if that be done, they yield good Crops. When worn out, they lay them down with Clover or Ray Graſs. In ſome Places they fallow them every other Year, except they ſow Peaſe upon them.

If inſtead of finding this Land bare, the Farmer ſees it full of Weeds, he begins with fallowing it at once, and afterwards proceeds as before.

I don't give theſe as the beſt Methods: but I have ſeen them practis'd with Succeſs. However, I think thoſe before laid down, as they are founded upon better Principles in Reaſon; and confirm'd in the ſame Manner by Tryals, deſerve the greateſt Regard. In ſhort, the Buſineſs with a gravelly Soil, where it is poor, naked, and hungry, is to give it Earth, and take Care afterwards when a Soil is in this Manner made, to improve it by enriching Manure; in the ſame Manner as if Nature had done the reſt.

In Bedfordshire, where they have ſome clayey Gravels, they dreſs them in a Way different from all thoſe hitherto named. Their Manure is Chalk, and they blend this well with the Soil by frequent Plowings. Experience ſhews this to be no bad Method, and upon a fair Compariſon between the Crops of theſe Lands, and of thoſe of a like Nature dreſs'd with Marle, the Difference appears to be, that the Effect of the Marle is greater at firſt, but that of the Chalk is more laſting. The Farmer therefore who has both theſe Kinds of Dreſſings in his Power, is to be guided in the Choice by his own Circumſtances.

They have an Opinion, that the Effect of Chalk, tho' it laſts ſo long, yet is fatal to the Land in the End; but this is a Miſtake. It is owing either to their not ſeeing far enough before them; or to their Ignorance of a proper Management at the End of the Time.

It is true, that the Strength which Chalk gives to a clayey Gravel, tho' it laſts a great while, does not hold for ever: but is this a wonder! To be ſure, Land dreſs'd any way will wear out at laſt, but when it comes to this, let it be laid down for Clover or Ray Graſs; and proceed as before directed.

The Farmers ſeeing the Effect of Chalk ſo great, think it will hold for ever, and their own Folly is the Cauſe of the Complaint.

In general, the gravelly Soils need leſs plowing than many others. Thoſe of the clayey Kind, demand more than the reſt; the ſandy very little. They are all forward Soils: but in different Degrees according to their Natures: the ſandy Gravel puſhes the Growth as much as any whatſoever. It requires a great deal of Care in Dreſſing; but when that is done, it anſwers very well: it is a light ſweet Soil, and is hurt by much plowing.

The expenſive warm Dreſſings brought from London, ſuch as Horn-ſhavings, Coneyclipings, and the like, lie a great while in theſe Soils, and continue their Efficacy. On the other hand, the folding of Sheep on them takes the quickeſt Effect, but it is the ſooneſt exhauſted. The Farmer who attends to this, will ſee that there is no giving a general Advice on this Head, but that he muſt conſider his own Situation, as well as the Condition of the Soil. One Manure may be proper if he be like to hold the Land a great while, another if his Time be uncertain: for there is no Occaſion that he ſhould be at a great Expence, for his Succeſſor to reap the Profit; as often happens.

Where the Gravel is ſandy and with a little Clay, the beſt Dreſſing of all others is pure ſoft Mud from the cleaning of Ditches: when the Clay is in a greater Proportion, Marle is better; and when yet more then Chalk is to be uſed as ſaid before. Let not any one ſay I here repeat

what is ſaid before. The Circumſtances vary by ſmall Degrees. I would give the practical Farmer Advice in all: and I had rather be ſuperfluous than deficient.

In fine, the Fruitfulneſs of a gravelly Soil of any of theſe Kinds, when rightly manag'd, is ſurprizing. Few Lands produce better Crops of Wheat, and it is a ſtrange Sight to ſee the Corn growing ſo thick, where there ſeems to be nothing but Pebbles: but the Caſe is this, there is Earth at a little Depth, and the Roots of the Corn are fix'd in it although their Stalks ſtand up only among the Stones. When a Soil of this Kind is perfectly manag'd, the Manure proper, and laid on in a right Manner, and at a proper Seaſon, the Rains waſh in all its Richneſs, and the Roots have it: in the mean Time that the Gravel which ſeems naked above, defends thoſe Roots from being burnt by the Sun, and keeps a continual Moiſture, in ſome Degree like what is ſeen under a Stone or Board that lies on the Ground; which feeds the Stalk and Ear every Moment.

The ſtony and gravelly Soils have an Advantage in this Reſpect, over all others; which the Farmer never fails to find, when he brings them in other Reſpects to a level with the others by his Dreſſings.

The gravelly Soils in general, produce a ſweet Graſs in Paſture Grounds, and when dreſs'd according to their ſeveral Kinds, with Mud, Dung, or Marle, they will yield it in a fair Quantity: but the Farmer is to take Notice of this, that there is no Soil for Paſturage that requires more Care than this does, otherwiſe, however good at Heart, it may deceive his Expectations.

For the Manure of Paſture Grounds on a gravelly Soil, there is nothing like a Mixture of mellow Dung, pure Ditch Mud that has little or no Sand in it, and the Bottoms of old Hay-ſtacks. This ſpread at a Seaſon when there is a Proſpect of Rains to waſh it gradually in, has a prodigious Effect.

Trees ſucceed in this Soil rather in Proportion to what is underneath it, than to the Soil itſelf. The Beech often grows well in it, and the Aſh. In ſome Places the Elm; but not univerſally. The Farmer may obſerve, however, that he need never be afraid of Trees in theſe light Soils hurting his Corn; for they ſeek their Nouriſhment at a greater Depth.

CHAP. XVII.

Of chalkey Soils.

AS there are naked Sand, and naked Gravel in ſome Places, on the Surface of the Earth; in the ſame Manner there is frequently naked and almoſt pure Chalk: and there are Parts of ENGLAND in which the Farmers are at the Expence of cultivating it; the Rent being low. But this is not what we mean in general by a chalkey Soil. We expreſs by that Name a Soil in which Chalk is a principal Ingredient; but where, as in the other Inſtances, there are other earthy Subſtances mix'd with it.

A chalkey Soil diſcovers itſelf to the Eye: none more plainly: its Whiteneſs cannot be miſtaken. There are white clayey Soils, as has been obſerv'd before, but they look darker for Rain; whereas the chalkey Lands appear the whiter. There is alſo a Greaſineſs in the Look of the Clays of this Colour, which diſtinguiſhes them from the others.

The chalkey Soils differ more in their ſeveral Kinds than any of the others. In thoſe all the Difference ariſes from the Matter which is mix'd with the main Ingredient; but in theſe that principal Subſtance differs greatly itſelf in various Places. For Inſtance, Gravel is Gravel, and Sand is Sand, whatever is mix'd with them; nor is there much Difference between the Gravel of this Place, and the Gravel of another; but Chalk varies greatly in its Nature and Qualities. There is ſome as hard as a Stone, and others as ſoft as Marle. Yet we call all theſe by the ſame Name, Chalk.

In other Words, there is Chalk to be met with in ENGLAND, from the Hardneſs of a good firm Stone, ſuch as requires a ſmart Blow of a Hammer to break it, down to the Softneſs of Marle, that may be crumbled to Pieces in ones Hands: now, as the chalkey Soils in ſome Places may have one of the hard or ſtony Chalks for their Foundation; and in others, may be compos'd principally of the ſoft Kind: this makes a great Difference in their Nature, and in the Management they require, independently of the ſeveral other Matters in the Mixture.

It is neceſſary to name theſe Differences in thoſe Soils which go by the ſame Name, to the Farmer, and it will be neceſſary for him to regard them nicely; otherwiſe all Inſtruction will anſwer no Purpoſe to him. One chalkey Soil may be little improved by that Method, which in the greateſt Degree enriches another; and he will learn nothing from all the Experiences of others on this Head, if he do not exactly underſtand on which of the Kinds of Soil compriz'd under this extenſive Term, each was ſeverally employed.

In general, according as the Chalk is harder in theſe Lands, the Soil is the worſe: and it is better as a ſofter Chalk is in the Compoſition.

The ſofteſt Kind of Chalk, which, as I have ſaid, may be rub'd to Pieces in one's Hands, is frequently in theſe Soils, mixt with a fatty and ſomewhat tough Subſtance, which converts it into a kind of marley Earth. This is really a Mixture of a greyiſh Clay and Chalk, and this is naturally the richeſt of all the chalkey Soils. It is alſo the eaſieſt work'd.

A few Plowings do on this Kind of chalkey Soil; and a little Manure. They have it on the Sides of Hills in many Places in BEDFORDSHIRE, and the adjoining Counties. They dreſs it at a ſmall Expence, and it produces great Crops.

When the chalkey Soil is of this ſoft Kind, it is to be plow'd deep, tho' not often: on the contrary, the harder chalkey Soils are to be plow'd but ſhallow.

It is a great Advantage of chalkey Soils, that they are the leaſt of any over-run with Weeds. What they principally produce are Poppies, May Weed, and a few other of the ſlight rooted

and

and annual Kinds. The pooreſt Kinds are eaſily got into Order; and what is ſpent in Manure, is in a great Meaſure ſav'd in Labour.

In Oxfordshire they are fond of throwing this Land up in Ridges; and in this they are right. The Farmer of another County laughs at them, ſuppoſing they do it for Dryneſs, which is not needful; but their Forefathers who invented the Practice did it for Warmth: and their Deſcendants who follow the ſame Courſe find the Advantages, though they don't know the Reaſon.

When it is of the harder Kind, they dreſs it with half rotten Dung; and when of the ſofter Sort, they lay on fine Mud, and a little well rotted mellow Dung with it. This melts into the Soil with the Rains, and gives it a ſurprizing Fertility.

What they call in many Counties a malmy, or maumy Soil, is one of theſe chalkey Lands: it is compos'd of a ſoft Chalk, and a white Clay together, with a little ſharp Sand. This Mixture naturally makes it ſoft and tender: for the white Clay is not tough in the Manner of the others, as has been ſhewn already, and the Sand makes it more brittle. It falls to Pieces in plowing, ſo that it needs but little of that Exerciſe: and it crumbles with the leaſt Froſt.

This Soil is by Nature in the Condition that many other of the chalkey ones are brought to by Manure and Dreſſing: and the Farmer ſeeing the natural Fruitfulneſs of this, will know he cannot do better with many of his leaner chalkey Soils, than bring them as near as he can to the Condition of this: adding by Art what they want in Nature.

This ſoft chalkey Soil is to be laid in Ridges for Dryneſs, and for Warmth. It requires leſs Manure than many others. And the beſt is rotten Dung.

The lighter and looſer a chalkey Soil is, the leſs plowing it requires: and if the Farmer wants to give it more than needful ſuppoſing it will ſtill do good, he is to be informed, that he will ſpoil it. Too much plowing in theſe Soils is as miſchievous as too little in the clayey. If theſe be broke too fine, they will not have a ſufficient Body to ſupport the Roots of the Corn, but it will fall down before the leaſt Wind, and be deſtroyed.

For chalkey Soils in general no kind of Dreſſing is ſo good as that which is given by folding Sheep upon them: for this is a Manure that quickly gets into Land: and this light Soil the moſt readily of all receives it; and yet it has Body enough to detain, and take Advantage of all its Richneſs.

There is alſo another Advantage in this Practice, which is, that the continual treading of the Sheep preſs the Ground, and give it a Firmneſs which all theſe Soils want, from the Nature of their Compoſition.

In Oxfordshire they plow in old Rags, by way of Manure, upon the poorer of their chalkey Soils, and that with great Succeſs.

When the chalkey Soil has a Mixture of a tough Clay, as is often the Caſe, it becomes one of the moſt binding Earths the Farmer has to do with. The Manure for this Land is well rotted Dung, with Pit Sand among it: this gives it a Shortneſs with the Richneſs, and makes it work eaſy, and bear well.

In Hertfordshire the Advantage of Soot is ſo well known as a Manure, that there are few Soils on which they do not uſe it. They find it a very rich Dreſſing for the pooreſt of their chalkey Soils.

They alſo uſe here the Oxfordshire Manure of old Rags; but they lay them on differently. They don't plow them in as in that County; but firſt chop them to Pieces, and then ſprinkle them on by Hand. The Rains ſoon rot them, and carry in their very Subſtance to the Soil, where it proves a rich Manure. Twenty Buſhels of Soot will go as far as Five Hundred Weight of Rags; the Effect of the Soot is quicker, but that of the Rags is more laſting.

The beſt Crops on the chalkey Soils when well manur'd, are Wheat and Barley. In Oxfordshire they make this conſtant Difference between the clayey and the chalkey Soil: that on the firſt they ſow Beans after the Wheat, and on the latter, Peaſe; which ſeldom fail of yielding a great Growth.

The Farmer ought to keep a conſtant Regard to the Weather, when he is about to ſow his chalkey Soils. It is of great Importance to him to ſow in a fair and ſettled Seaſon: for any Quantity of Rain falling ſoon after the Sowing, will bind ſome of theſe Soils ſo hard, that the Seed will be loſt.

Oats do very well upon theſe Soils, but not like Wheat or Barley; and of the two laſt the Wheat is the moſt to be depended upon. The Barley that has grown upon chalkey Lands, is prefer'd by the Malſter to that of any other Soil whatſoever; but this is a Crop that does not make ſuch certain Returns, the Farmer that chuſes it muſt ſtand the Hazard; for ſometimes it fails ſtrangely.

Rye alſo ſucceeds on a chalkey Soil properly dreſs'd: no where better.

It is not only Peaſe that grow ſo freely upon theſe Soils; they agree in a particular Manner with all the Pulſe Kinds. Tares and Lentils will grow well upon the very pooreſt of theſe Chalks.

No Soil better nouriſhes the tenderer of the Graſſes; Clover does not do well except upon the richer Kinds; but in general, the Saintfoin, and the other fine Graſſes, ſucceed upon them to Admiration, becauſe of the Lightneſs; particularly the Saintfoin, whoſe long Root pierces to a great Depth, and will therefore find Moiſture and Nouriſhment, when all is dry and parch'd on the Surface.

Chalkey Soils are not the moſt favourable for large Growths of common Graſs for Hay; but they furniſh a ſweet Kind for Paſturage; and the better Sorts of them when dreſs'd properly with Mud and rich Dung, will afford very fair and tall Graſs. But it is a Soil naturally found in hilly Places, and that ſeems deſtin'd by Nature for the Plow; rather than for the Growth of Trees or Graſs.

CHAP.

CHAP. XVIII.

Of mellow Earth.

WE come in the laſt Place to the Conſideration of that Soil which is called Mould, or mellow Earth; the Richeſt in its own Nature of all; and needing leſs Dreſſings than any other; yet not entirely above the Neceſſity.

As the Soils laſt treated of, the chalkey Kinds, are naturally met with on Hills; the Seat of this is in the Valleys and low Grounds; and as thoſe ſeem deſtin'd by Nature for the Plow, theſe are in the ſame Manner for Paſture.

This is its Condition in its moſt pure and entire State; but there are ſeveral Kinds of this Soil, as well as of the other, altho' they have hitherto been leſs taken Notice of, and ſome of theſe are found on higher Situations, and admit the Plow; and yield large Crops of Corn.

What is properly called Mould, is found in its moſt pure State under the Turf in Fenny Countries. Here there is neither Clay, Stone, nor even Sand amongſt it. In other Places it is mix'd in a greater or leſſer Degree with one or other of theſe.

Properly ſpeaking it is to be called Mould only, in this State, as Gravel, Chalk, Clay, and the reſt are only called by thoſe Names ſimply when they are pure: and as they when mixt with other Ingredients make the gravelly and other Soils nam'd from them; ſo when this Mould is found mix'd with Clay, Sand, or the like, it conſtitutes many of the ordinary Kinds of Soil. But theſe are not not called mouldy Soils, but mellow Earths. So Cuſtom has eſtabliſh'd.

It is only, however, when the Mould is in the greateſt Quantity, that theſe Mixtures have the Name of mellow Earths: when the Sand is in the greateſt Quantity, the Soil is called ſandy; when Clay, it is called a clayey Soil. For the Mixture of Mould when ſmall, does not give a Name to the Soils; but, as before obſerv'd, converts the naked Gravel, or pure Clay, or the reſt into a Soil.

I have ſpoken all along of a pure vegetable Earth being mix'd with theſe ſeveral Ingredients in the Formation of Soils. This Mould which is the Foundation of the mellow Earths, is that vegetable Earth. I have ſaid at firſt that it is ſcarce ever found entirely pure: but there are Places where it ſufficiently near Purity, to give a full Knowledge of its Nature.

The Gardiners frequently deſire to have the vegetable Earth pure; and on this Occaſion they ſeek for it in old Willows, and other decay'd Trees. What they find in theſe Places they call Virgin Earth, and pure Earth. It comes the neareſt what we mean by pure vegetable Earth: and we meet with this Mould in ſome of the Fenny Countries very like it in all Reſpects.

In Lincolnshire their fine Fen Land is of this Soil. A fine black Mould lies under the Turf in a Bed of very conſiderable Thickneſs. It is light, looſe, and black, and one ſcarce perceives any other Mixture in it but a little Sand, and that indeed is very little. It is ſpungy when wet, and when dry it eaſily moulders to Powder, and the ſmall Quantity of Sand lies naked among the reſt.

Some imagine Turf or Peat to be the natural Surface of all the Fen Lands, but that is owing to their Unacquaintance with the Matter. The right Turf or Peat is compos'd of decay'd Stalks of Plants, and other vegetable Subſtances, with a bituminous Matter that holds them together: it lies at ſome little Depth; and this fine black Mould in the rich fenny Lands lies over it, and immediately under the Sward.

There is no Soil in the World ſo fertile, or ſo rich, as this Kind of Fen Land, and it is owing to the Excellence and Purity of this Soil, which conſiſts of ſcarce any Thing but vegetable Earth. Too much wet affects it greatly: and as it lies uſually in theſe low Places, it is very ſubject to this Inconvenience; otherwiſe it would be preferable to all other Soils in the Eye of the Farmer.

In the fenny Countries where this Soil is frequent, they call it moory Land; and they value it very highly when it can be tolerably preſerv'd from wet.

This is the pure and perfect Soil of the Fens when they are not any way ſpoil'd. But beſide this, there is another mellow Earth in the ſame Situations, which they call Fen Land; this is a Name they give alſo in ſome Places to the laſt deſcribed; but, as they uſe it in ſome Places for the other, as diſtinguiſh'd from that by its Compoſition, and as it has no other Name, we muſt be content to call it by this to avoid Confuſion.

This Fen Land is a mellow Earth compos'd of the fine black Mould juſt mention'd, and a tough blackiſh blue Clay. It is black and ſoft: and has at a Diſtance very much the Appearance of the other. This is next to the moory Land, the richeſt Soil that is known for Paſturage. It needs little Manure, and in moſt Places Nature takes Care of that Article. It generally lies in the Reach of being overflow'd by the Rivers, when ſwelled by Land Floods; and as this Water ſtands upon the Lands ſome time, it leaves a fine rich Mud at its going off, which ſerves in the Place of Manure: and is better ſpread and let into the Ground by the Water wherein it is brought, than it could be by all the Farmer's Toil and Ingenuity.

We read of the River Nile in Ægypt overflowing their low Lands, and leaving its Mud, which ſaves the Farmer's Labour, and occaſions the great Fertility of the Soil. The ſame Thing in a leſſer Degree happens in theſe Fen Countries after every Inundation.

The Fen Land when dry, is tolerably firm and hard; and it then looks of a ſomewhat paler Colour: when wet it is blackiſh, and is ſoft and mellow, but with ſome Toughneſs. It has alſo a Smell at this Time like the Mud of a Pond in Summer, when the Sun has newly dried up the Water. This Soil is more apt to be wet than the moory Land, becauſe it has a deep Bed of Clay at the Bottom, and has too much Clay in its own Compoſition to part with Water ſuddenly.

It

It is alſo ſingular, that in the Fen Land there is no Sand. This is an Ingredient almoſt univerſal in other Soils; but in the true Fen Land, there is not a Grain of it to be found.

This Soil, though called Fen Land, becauſe uſually found in the Low Country, ſometimes alſo is met with in the higher Paſtures: but it is never ſo fruitful then as in the low Grounds, though it be evidently the ſame in its Nature and Compoſition.

I have particularly taken Notice of this about the Edges of the Fens, where the ſame Land or Soil that has run under the Turf in a low Meadow, has been continued through an adjoining Paſture which was a little riſing. The Paſture in this Caſe never is ſo rich as the Meadow, and the Reaſon of this is certainly, becauſe the Paſture Ground was out of the Reach of the Land Floods, which, running over the other Ground at times, left the Mud upon it to enrich its Nature.

The practical Farmer may learn by this, what he is to do with a Paſture which lies ſomewhat high, and has this Fen Land Soil. He is to dreſs it with Mud from the Bottoms of Rivers or Ponds, ſpreading it thin before Rain, that it may be waſh'd into the Ground; it is thus Nature enriches theſe Lands by the Overflowings of the neighbouring Rivers, and in this Manner Art may imitate her Proceedings; which are always the beſt Example it can follow.

The Effect of the Mud thus waſh'd into the Fen Land Soil, is to make it more and more like the Moory Soil, which is the richeſt of all others.

I have already mention'd in the general Account of Soils, one which in NORTHAMPTONSHIRE they call Henmould: this is common in the richeſt Paſtures of that and the neighbouring Counties, and is little other than the moory Land taken out of its low Situation. It is blackiſh, light, and fine, and is compos'd of the ſame fine black Mould with the other, only there is more of the Sand in the Compoſition.

We find this Soil principally, and in its greateſt Perfection, in thoſe Paſture Grounds that lie toward the Bottoms of Hills. I ſay in Paſture Grounds, for the Farmers who are acquainted with its Nature, do not chuſe to plow it: for, notwithſtanding its Fertility, it wants a Body to ſupport the Roots of the Corn.

In LANCASHIRE and the adjoining Counties, they have a Soil which they value exceedingly for its Fertility, and which they call the black Soil from its Colour. This is compos'd for the greateſt Part, of the ſame fine black Mould with the moory Land, but it has a larger Proportion of Sand, and ſome Clay among it. To ſpeak exactly, the black Soil of LANCASHIRE is compos'd of the Mould and Loam: according to this Compoſition, it differs both from the Moory Land and the Fen Land. For the firſt of theſe has ſome Sand in it, and no Clay; the other has a great deal of Clay and no Sand. This having both, is of a different Nature.

The black Soil in LANCASHIRE is not only very rich in Meadow and Paſture Ground, but in Corn Lands. The Clay in its Compoſition, is ſufficient to give it a Firmneſs enough to ſupport the Crop; the want of which is the Occaſion that the rich Henmould of the other Counties before mention'd, cannot be us'd for Corn.

In the ſame Part of the Kingdom they have alſo a rich Earth which they call the Foxglove Soil. They are not ſo exact in theſe Names as they ſhould be; but I ſhall always endeavour to explain them as well as I can, my Intent in theſe Things being to make the Farmer of one County underſtand him of another.

In LANCASHIRE they in general give the Name of Foxglove Earth to a ſandy Soil of a brown Colour, and tolerably rich: but in ſome Parts of that County, and in general throughout CHESHIRE, they call an Earth by that Name, which greatly exceeds the other in Fertility. This laſt Foxglove Earth is a mellow Soil compos'd of the fine Mould before nam'd, and a conſiderable Quantity of Loam of a rediſh Colour. I have obſerved theſe two diſtinct Soils in LANCASHIRE, the firſt in the low Grounds, where it makes a Soil altogether the ſame with the moory Land before deſcrib'd, and the other in the Paſtures on the Sides of Hills.

As I have ſeen theſe ſeparate, and traced them to the Mixture, I have found that the fine and rich Foxglove Earth of thoſe Counties, is compos'd of them. This is a very rich Soil for Paſture Grounds: the Graſs is ſweet, and in great Quantity.

I before mention'd alſo, an Earth which in ſome other Counties they call Henmould, and which is different from that which goes by the ſame Name among others: this is alſo of the Nature of the Foxglove Earth, it is a Compoſition of fine black Mould, a good deal of Clay, and a little Sand; or in other Words, it is compos'd of black Mould, and a clayey Loam. The whiteiſh Streaks they find in this on firſt opening it, are no other than the firſt Shootings of Muſhrooms: what Gardiners call the Spawn of Muſhrooms. The Paſture Grounds of this Soil are found to bear great Quantities of theſe; it is therefore no wonder this Spawn, as it is called, is found under the Surface.

This Henmould Soil will bear Corn tho' the other will not: it agrees with the Foxglove Earth in its Nature as well as Appearance: having a ſufficient Quantity of Clay in the Compoſition to hold the Root firm.

Having thus deſcribed the ſeveral Kinds of mellow Earth in ſuch a Manner, that they may be diſtinctly known from one another: it remains to give the Farmer, who ſhall be thus made acquainted with their Nature, the neceſſary Inſtructions in what Manner he is to employ them to Advantage.

In the firſt Place then, he will ſee by what has been ſaid already, that as many other Soils are naturally calculated to bear Corn, theſe are naturally ſuited for Paſture.

They will all produce good Graſs without any Exception: there are one or two of them that may be made to anſwer for Corn; but the Generality of them are not fit for that Uſe, nor ſhould a Soil be forced by the Farmer.

If he happen in any Situation to have an over Proportion of plow'd Land to Paſturage in his Farm, ſo that he cannot raiſe a Supply of Dung from the Cattle of the one, for the needful

Manure for the other. In this Caſe it will be neceſſary for him to lay down ſome Part of his Arable to Paſture: and in the ſame Manner if his Paſture Land be ſo much, that there is more Dung produced by the Cattle than he can uſe on his Fields, it will be prudent in him to convert ſome of his Paſture to Corn Land. For it is always the Farmer's Intereſt, as nearly as he can, to keep up this Proportion.

Now if it happen that his Paſturage be principally upon this mellow Earth; his Buſineſs is firſt to examine if it be of one Kind throughout the whole Farm, or if there be a Variety.

The latter is more uſually the Caſe: and ſuppoſing it ſo in the preſent Inſtance, let him chuſe out the Piece that ſhall be plow'd according to the Account that has been given of their Natures.

The mellow Earths are all ſo rich, that they will ſupply Nouriſhment abundantly to a Crop of Corn; but the greater Part of them are, as has been ſaid, ſo looſe and crumbly, that they will not ſupport the Crop in their Place. They will never ſettle enough to the Roots of the Corn to keep it ſteady whilſt it is growing up, and when it is not firm it can never thrive.

But this is not the only Objection againſt converting this mellow Earth, which is the natural Soil of Paſturage, to Tillage. The finer Kinds of it are apt to be wet, they generally lie over a Bed of heavy Clay; and almoſt always in low Situations. The Conſequence of which is, that tho' they abound with Nouriſhment, it is of too moiſt a Kind, and feeds the Leaf rather than the Grain.

I have obſerv'd in Cheshire, when ſome Fields of this Soil that lay at the Bottom of Hills, have been forced into Corn Lands; the Farmer has expected great Profits at firſt, for the Corn grows upon them prodigiouſly, but the Nouriſhment goes to the Stalk and Leaves: it is over rank in the Straw, but lean in the Ear, and to the early Promiſe has ſucceeded a late Diſappointment.

Having ſeen thus much from Experience, I may have Leave to adviſe the Farmer as before, not to be too fond of converting this Soil from Paſture to Arable. But if he be under a Neceſſity of doing it, let him take the following Rules for his Inſtruction.

Let him chuſe out of all the Kinds in his Ground, that which has moſt Clay or Loam in the Compoſition; for that, altho' it ſucceeds by ſo much the leſs in Paſture for this Addition, is the only one fit for Corn; becauſe it is the only Kind of mellow Earth that will cloſe enough about the Roots of the Corn to keep it upright and firm. By obſerving this Rule he will take the Piece that is leaſt valuable for Paſture; and at the ſame Time that which is beſt for the Corn: thus reaping a double Advantage.

In the next Place, let him chuſe ſuch a Piece as lies ſomewhat riſing; becauſe the Abundance of Moiſture is the Cauſe of that Rankneſs in the Stalk, which robs the Ear; and thoſe mellow Soils that lie on the Sides of Hills, are never ſo damp as thoſe at the Bottoms; the Water being continually draining off from the one, and running to the other.

This Rule will naturally fall in with the other: for the mellow Earths on riſing Grounds are always more clayey or loamy than thoſe which lie flat. This is the Conſequence of the Difference of Situation, for the fine Mould is continually waſhing off from the one, and coming down upon the other.

When the Soils of this Kind are forced into the Service of Corn, the beſt Manure for them is rich Dung. It is not eaſy to mend the Texture of a loamy mellow Earth, and therefore all the Farmer is to aim at is, to ſupply the Richneſs of the Soil in Proportion as it is exhauſted by his Crops.

In Leicestershire where they plow ſome of theſe Lands that are a little over clayey, they dreſs them with Marle to good Advantage.

The ſame Sort of Soils I have ſeen in Lancashire dreſs'd with Lime and Soap-makers Aſhes; the Farmers there ſuppoſing it too cold in its Nature, and giving theſe Dreſſings to warm it: this Practice was not without Succeſs, but the other Way with Marle upon equal Terms, I have always found had the Advantage, both in preſent Profit and in laſting.

In Lincolnshire they plow in Hare Skins, Rabbit Skins, and old Rags into theſe Soils when they dreſs them for Corn, as they ſometimes do thoſe that lie on the Sides of Hills.

Woollen Rags are altogether as good as Linnen on this Occaſion. There is a famous Inſtance in Northamptonshire, of a Man's dreſſing a Corn Land on a Soil not unlike one of theſe, with Taylors Shreds ſteep'd in Urine; the Conſequence of which was ſuch a Crop, as ſcarce ever had been ſeen.

This is a well atteſted Fact, all the Country talk of it; and it may ſerve to recommend to the prudent Farmer, a Manure which he may have at a moderate Expence from London, and which is likely to anſwer ſo greatly.

Having thus far conſider'd the Manures that are proper for mellow Earths, when they are uſed for Corn; it remains to recount thoſe which Experience has ſhewn to be moſt uſeful for it in Paſture. I have already ſaid this wants leſs Dreſſing than any other Soil whatſoever; but the beſt in the World may be improved by ſome Manures.

Before the Farmer take any other Step in this Matter, let him carefully examine the particular Kind of the Soil.

If it be a mellow Earth, with a good deal of a loamy Mixture, let him imitate, as before ſaid, the Courſe of Nature in enriching it, and ſpread upon it at proper Times the Mud from Ditches and Rivers.

If the Soil be a mellow Earth, with an over Proportion of Clay, ſuch as the Fen Land is, where there is no Sand in the Compoſition, it is to be dreſs'd with rotten Dung, mix'd with the Cleanings of the Highways, which are of a ſharp ſandy Nature, and will by Degrees get in and break the too great Firmneſs of the Clay, reducing it to a Kind of Loam.

Theſe Soils may alſo be improv'd according to their Compoſition and Situation by Dreſſings, conſiſting of Earths or Soils of other Kinds. Thus the moory Land of Lincolnshire might be

be converted as it were, into the black Soil of Lancashire, by dreſſing it with a brittle Loam, as that would mix both Sand and Clay in the Compoſition; and thus it would be made fitter for the Plow, if it be needful to put it to that Uſe.

In the ſame Manner the Henmould of Northamptonshire, and other Counties, might be made more fit to receive and ſuſtain Crops of Corn, by dreſſing it with a clayey Loam, which would break in upon it by Degrees, and when well mix'd with the Plow, would give it that Firmneſs it wants.

This is conſidering Manures in a Light in which they are not ſufficiently regarded by the Generality of Farmers. The common Way of dreſſing with Dung, and the like, is enriching, but this is making a Soil.

The richeſt of theſe Soils for Paſture, that is, the moory Land, is liable to great Damage by wet. The Remedy for this is burning the Land: this is practiſed to great Advantage in all the Fen Countries; and it may be introduced elſewhere to the Farmer's great Profit.

The moory Soil, as it moſt wants this Method of Improvement, ſo it ſucceeds with it the moſt readily of all; burning more freely than any other Land: the Herbage on its Surface kindling eaſily, and burning well.

The Method practiſed in Lincolnshire, where they underſtand this Practice beſt, is this, they plow up the Sod as ſhallow as they can, and pile it up in little Heaps, laying ſome Pieces of Furze Buſhes, or ſome Pieces of Peat Earth here and there among it, to make it burn well. When this is done, they ſpread the Aſhes which greatly enrich the Land: ſo that it becomes not only drier, but in all Reſpects better than before.

The Trials that have been made of reducing this Paſture Soil to Arable, have ſeldom ſucceeded: after a little Time the Farmers have been glad to lay it down to great Sward again.

If at any Time the Farmer who ſhould try the Experiment, ſhould be brought to the ſame Neceſſity, as is not unlikely, I ſhall give him the Advice that the laſt Crop he ſows upon it be Wheat. Becauſe in that Caſe the Ground will gather Graſs before the Wheat is cut: and the Stubble is of uſe in manuring the Ground.

But tho' theſe mellow Earths in general do not ſucceed ſo well with Corn, there are other Crops for which they are plow'd to great Profit.

Coleſeed will thrive exceedingly upon the melloweſt of them all. They frequently plow up the moory Land, which is all black Earth, without almoſt any other Ingredient for this Purpoſe, and it yields vaſt Crops.

The principal Manure they uſe for the Lands on which they raiſe this Crop, is the burning of the Sods before mention'd; and they find that Coleſeed always thrives vaſtly better on a freſh Land than any other: but it will ſucceed very well on the ſame Land again; burning the Stubble.

This is the only Uſe the Stubble of the Coleſeed Plant is fit for, they never plow it in, for it is ſo hard and ſticky, it will not ſoon rot.

Oats, next to Coleſeed, thrive beſt on the richer Kinds of theſe mellow Earths. As the Coleſeed does beſt on freſh Land, the Farmers in Lincolnshire, when they have had one Crop of Coleſeed, generally ſow Oats the two or three following Years, which anſwer very well with a little Manure. They ſometimes ſow Wheat or Barley after the Coleſeed, but it is not ſo ſure of Succeſs. In a dry Year it is often render'd of no Value, by tumbling down from the looſe Nature of the Soil not holding the Roots; and in a wet Year, the Ground becomes ſo damp, that the Growth is rank in the Stalk, as mention'd before, but thin and poor in the Ear.

After three Years Oats, upon a Year of Coleſeed, the Cuſtom is to lay it down for Graſs. For this Purpoſe they ſow Ray Graſs with the laſt Oats; and when it has been kept thus ſix Years, they plow it up ſlightly, and burn the Sod, after which they ſow it with Coleſeed again.

The mellow Earths of the finer Kinds, are not very favourable to the Growth of Trees. One Reaſon of this is, that they want Firmneſs to hold the Roots, for there is Abundance of Nouriſhment; another is the great Moiſture.

In the pureſt Kinds, ſuch as the moory Land, we ſee ſcarce any other Tree except the Willow. This is the Fen Tree, and often in the Compaſs of a great many Miles, no other ſhall be ſeen.

As the mellow Earths partake more and more of the Nature of the other Soils, they more reſemble them in their Trees. Thus when this Land gets a ſmall Proportion of Loam, the white Poplar grows freely upon it: and the Foxglove Earth of Cheshire, and ſome of the mellow Earths of Northamptonshire, bear the common Kinds of Trees in ſufficient Perfection.

In general, Trees grow quickeſt in a rich, but they are firmeſt in a ſtrong Soil. The Oak grows tediouſly in the clayey Grounds of Northamptonshire, but its Wood is ſound in Proportion.

This is not an Obſervation in favour of theſe mellow Soils for Trees: but 'tis proper, ſince the Truth confirms it, to lay it down as a Caution to the practical Farmer, that he make no Attempts of that Kind. Every Soil has its natural Produce: and ſo far as Convenience will allow, that ſhould be followed; for whatſoever is the Growth to which a Soil is fitted by Nature; the ſame is that with which it will beſt ſucceed under the Improvements of Art.

The End of the First Book.

Appendix

Appendix to the First Book.

Of the Uſes of Clay, Loam, Sand, and other Subſtances found on or in the Earth, in the various Arts; and their Value to the Owner.

The INTRODUCTION.

Of the Deſign and Bounds of this Appendix.

HAVING conſider'd the ſeveral Kinds of Clay, Sand, and the like, as they enter into the Compoſition of the different Soils; it remains that we enquire into their Nature and Uſes in their pure and unmix'd State.

They not unfrequently lie on the Surface of the Earth, or make its uppermoſt Covering in their entire State. It has been obſerv'd already, that in this Caſe they are not properly called Soils, though they take the Place of a Soil; and that they are frequently, in this Condition, not worth the Expence and Labour of Dreſſing.

Although they do not come under the Farmer's Conſideration in this State as Soils; yet making a part of his Land, it is needful he ſhould underſtand their Value, and how to make the moſt of them.

This Examination did not come under the Heads of the preceeding Book; the Subject of which was the underſtanding of Soils, and their Improvement for different Growths: to avoid Confuſion, it is therefore treated of in this Appendix by itſelf.

To enquire into the whole Compaſs of the Uſes to be made of Things found under the Surface of the Earth, would be a Subject too wide; and foreign to the Purpoſe of this Work: but ſo much of this Enquiry as may concern the Farmer or the Country Gentleman, ſhall be inſerted. The Deſign of our Undertaking is to inform the Poſſeſſor or Cultivator of Land, whether Owner or Tenant, of all it can be uſeful to him to know reſpecting it. The Plan of the Work engages to enquire into theſe occaſional Uſes of Clay, and the other Subſtances; and it would be leaving the Poſſeſſor of Lands in the dark, as to ſome Uſes he might make of them, ſhould any Thing of this Kind be omitted.

The Intent of this Work is to be as largely and as generally uſeful as poſſible.

CHAP. I.

Of the Uſes of Clay.

THE Farmer who finds Clay naked on the Surface of ſome Part of his Land, needs not deſpair of Advantage. Though it may not be worth the Charge of Culture, it may anſwer other Purpoſes: and that he may know what to expect from each Kind they ſhall ſeverally be recounted.

The firſt Thing to be done is, to enquire of what Kind the Clay is, and of what Nature. Here following the Diviſion before eſtabliſh'd of the four Kinds of Clay according to their Colours; the two firſt, that is, the red and yellow, are the moſt frequently found at or near the Surface: the black and the white Clay in moſt Places lie under the Soil, or at greater Depths.

When theſe are altogether pure at the Surface, he may begin with them there, but when they have ſome Mixture there, as where there is what may be called a very poor red clayey Soil, the red Clay will probably be found quite pure and entire at a little Depth, and that often in ſo thick a Bed, that the opening a ſmall Pit for it, brings great Profit with very little Expence of Labour.

The red Clay is the moſt valuable, as it anſwers not only the beſt Purpoſes, but the greateſt Number of them. It is not of a perfect red Colour, as the Name uſually given it ſeems to expreſs; but brown with a Tinge or Caſt of rediſh. It has the Name of red by way of Diſtinction from the yellow.

Nothing is equal to pure red Clay for ſecuring the Bottoms of Ponds for holding Water. When the Nature of the Earth is ſo looſe that they drain dry, whether the Soil be gravelly, ſandy, or whatever, if the Bottom be lin'd with red Clay well rammed, the Pond will hold Water for many Ages, as if it was dug in a Bed of Clay. In ſome Places they improve upon this. They firſt ram down a lining of red Clay, and upon that lay a good pitching of Stones; this makes a Bottom as firm, as ſecure, and as durable as Lead.

The

The red Clay exceeds all others for the Brewery. 'Tis beat and temper'd to a due Conſiſtence for covering Bungholes of Barrels. If the Farmer at any Time finds it apt to crack, the Remedy is to beat it up afreſh with ſtrong Brine inſtead of common Water: this keeps it firm and entire.

In the Grafting of Trees they prefer the red Clay to any other, but they beat it up with Horſe Dung, this prevents it from cracking as it dries: with Hay chopt ſmall, it makes a Covering for Sheds and Cottages, inſtead of Walls. This anſwers the ſame Purpoſe with Dung in the other Inſtance; and might in others.

When calcin'd, it makes an excellent Manure. This Management reduces it to a Powder like Aſhes. This is to be ſprinkled by hand over the Ground, and is excellent either for Paſture or Corn Lands: it gives Strength and Heart to other Soils. This is a new Practice, and is one of the great Improvements of the modern Huſbandry.

Theſe are the principal Uſes of the red Clay, and from this it is very plain, that a Pit of it open'd in a convenient Place, may be of vaſt Uſe to the Proprietor himſelf, and may afford conſiderable Profit by the Sale.

The yellow Clay is neareſt to the red in its Nature and Qualities, and is uſed in general for the ſame Purpoſes. It is often found as perfectly pure as the red, and is then as ſmooth and fine, but it wants ſomething of that ſound Firmneſs there is in the red Kind. Where the red is to be had, this is to be rejected as inferior, but generally thoſe Counties which produce the red in Abundance, have little of this; and on the other Hand, thoſe where this yellow Clay is common, have not a great deal of the red.

Nature ſeems in theſe Counties to have given the yellow Clay to make Amends for the Want of the red; and it is to be uſed in its Place, but there muſt be more Care in the managing it. Although it ſeems to temper with leſs beating, yet in order to bring it to a good laſting Conſiſtence, it requires more than that; and when all is done, it is more liable to crack as it dries, and to waſte upon the Surface by continual wet: for it ſoon grows ſoft and pappy where wet always lies upon it, though this be only to a little Depth. The other therefore, where the Farmer has his Choice, is to be prefer'd for all Purpoſes.

There are many Things in which the red and yellow Clay agree, as they are nearly of the ſame Nature. Either of them will ſerve for Bricks: the red in particular makes an excellent Kind, of no very bright Colour, but of great Strength. They are not us'd much, however, for theſe Purpoſes: the Brick Makers do not chuſe to make pure Clay; it takes a great deal more Labour and Time to temper it for the Mould; and when it is done ſhrinks in the drying. The Bricks made of it are ſtrong, but dear.

They prefer for their Uſes ſome of the Loams to be deſcribed in the next Chapter, becauſe they cut and temper eaſier. Where theſe are not to be had, they will uſe Clay, but then they mix it with Aſhes, and the Dirt out of Streets to give it a due Shortneſs, and make it work eaſily.

When the Loams which they properly call Brick Earth, are not ſandy enough, they mix Aſhes or other dry Stuff with them in the ſame Manner.

Both the red and yellow Clay are uſed alſo in the Potteries of ſeveral of our Manufactures, but ſeldom alone. The yellow is one of the Ingredients of the common STAFFORDSHIRE Ware; and the red is mix'd into the Compoſitions for their better Work. The yellow is alſo a common Ingredient in making of Garden Pots for it burns to a rediſh Colour.

The beſt natural Clay I ever ſaw for Bricks is in OXFORDSHIRE, where in ſeveral Places I have ſeen a mix'd Kind, partly yellow, partly blueiſh, of a tender Nature, and with ſome Sand among it; this works eaſily, and makes exceeding good Brick.

If the Farmer find an Earth of this Kind, provided it be in the Way of good Carriage, it is a Treaſure; no-body will take the tough Clays for Bricks, if they can get theſe which are tenderer: if they are abſolutely brittle it will not do, but the middle Conſiſtence is what gives them their Value.

It is very common that where the Clay near the Surface, is of a tender and brittle Kind, there is a Bed of a firmer and tougher Sort underneath. It often happens that theſe two being mix'd together, make an Earth of a due Conſiſtence. For theſe Reaſons he who has a mind to make Bricks upon his own Ground, needs not be diſheartened whatever be the firſt Appearance of the Clay, for where there is almoſt any Sort it may be done. The very foul and brittle Kinds are the only ones that can't be us'd for this Purpoſe: otherwiſe they may be either wrought alone, or mended with Dirt or Aſhes, or one Kind will mend another.

I have obſerv'd in ſome Places, a yellow Clay with a ſmall Admixture of Sand in it, this is ſo little that it does not deſerve to give it the Name of a Loam. This is an excellent Earth in Pottery. It often lies in STAFFORDSHIRE near the Surface, ſometimes on the Surface of the Ground, and they make Mugs, Diſhes, and a very good Kind of Earthen Ware of it alone. It is ſo firm that it works well, and another good Quality is, it takes the glazing excellently.

The red Clay being firmer than this yellow Kind, one would ſuppoſe it would make a ſtronger Ware: but I have obſerv'd the contrary, where they work the beſt of the red Clay ſingly into any of the tolerably fine Ware, it does not take the Glazing well, and it is very brittle.

The very tougheſt and fineſt of all the STAFFORDSHIRE Earths, of which they make ſuch Advantage in their Potteries, belongs in ſome Degree to the yellow Clay Kind. It is a pure, tough, and firm Clay, but is not uniform in Colour, being mixed and ſtreaked with white. This they call Bottle Clay in that County, and value it more than any other for the Body of their Ware.

Thus much I have thought needful to obſerve in reſpect to the two firſt Kind of Clays, that

the Perſon in whoſe Hands they may chance to lie, may underſtand their Nature and Uſes, and conſequently their Value. That he may not overlook through Ignorance, ſuch as are worth his Conſideration, nor be inveigled by ſcheming Perſons, to undertake Works for which they are not fit.

As to Bricks wherever there is a tolerably good Clay, they may be made one Way or another, as deſcrib'd already: as to the Potteries, there is more in the Mixture of different Kinds of Clay, than in uſing any ſingly. But it is certain that the fine STAFFORDSHIRE Bottle Clay, which is the Ground Work of their Pottery, is to be found in other Places; for I have met with it in WORCESTERSHIRE, LEICESTERSHIRE, and HAMPSHIRE.

Under the Head of BLACK CLAYS, we uſually comprehend all that are of a dark Colour, the blueiſh and dingy, as well as the entire black, which is leſs common.

The blueiſh black Clay, which is the moſt common Kind, uſually lies at ſome Depth; but it generally makes Amends for the Trouble of geting at it by tho Thickneſs of the Bed. It is a pure, hard, and tough Clay: its general Uſe is for making of Tiles for Houſes, and it has thence got the Name of Tile Clay.

There is at leaſt as much Toughneſs in this as in the red Clay of the firmeſt Kind, but they are contented to work it without Aſhes or Dirt, becauſe they are paid a better Price for the Tiles, and becauſe they require to be ſtronger, and of ſounder Materials, as they are more expoſed to Weather, with a thinner Subſtance.

There is alſo another Reaſon why they work this tough Clay entire, and without Adulteration for Tiles. They muſt be made of an Earth that will bear bending, for the Ridge and Gutter Tiles require this in a great Degree, and no Earth will bear this that has any great Mixture of Sand or Dirt: they therefore are honeſt thro' Neceſſity in this Caſe, and uſe the Clay pure.

The red and the yellow Clays often riſe to the Surface in ſuch a Degree of Foulneſs, that it is poſſible either to cut them as Clay, or to cultivate them as Soil at the Owner's Choice; but it is not ſo with the black. Where that is ſo mix'd that it can be cultivated, it is never worth taking up as Clay; and where it is ſo pure that it may be us'd as Clay in Manufactures, it is very rarely worth the Expence and Pains of Cultivation.

Beſide Tile-making which is the general Uſe of this Kind, they in many Places work it into a Sort of Pottery; when us'd alone it makes but an indifferent Ware; but being mix'd with other leſs compact Kinds, it gives a great deal of Strength and Firmneſs.

In NORTHAMPTONSHIRE they have a Clay that is quite black, and the Uſe they make of it will ſeem at firſt Sight extraordinary, they make Tobacco Pipes with it: but it burns to a perfect Whiteneſs.

This Clay is dug near the Town of NORTHAMPTON, and was one of the firſt uſed to this Purpoſe in ENGLAND. It is a fine, ſmooth, ſoft Clay, of a deep black, free from any Admixture of Sand. It is very heavy, and is naturally ſo hard, that they are oblig'd to ſoften it with Water to get it out of the Pit.

This is ſo valuable a Clay, that it is well worth the Owner's while to regard it very carefully if his Land promiſe to contain it. Sometimes it lies near the Surface, rarely at any great Depth; and it is uſually in vaſt Cakes or Benches, and not in a continued Bed.

It is not confin'd to the Place I have named for Uſe, nor to the ſingle Article of making Tobacco Pipes. 'Tis carried by Land from NORTHAMPTON into all the neighbouring Counties; and is one of the principal Ingredients in the NOTTINGHAMSHIRE Potteries.

Next to this is to be named a deep gray Clay, that in the ſame Manner burns white, and is uſed alſo for Tobacco Pipes. It uſually lies near the other; and ſcarce differs at all from it except in the Colour.

There is a black Clay found in many Parts of ENGLAND, which is as fine and as tough as the former of theſe, and would anſwer the ſame Purpoſe of Pipe-making, but it burns red. This makes an excellent Kind of red Pottery, and is uſed in many Parts of ENGLAND. The Farmer will not be able eaſily to know one of theſe Kinds of black Clay from the other by the Eye; but if his Land affords a black Earth of ſuch a Kind, he needs only put a Piece of it into the Fire: if it burn white it is the Pipe Clay; if red, the Potters Kind, but either is very valuable.

As I include the blue among the Liſt of black Clays, I muſt here name another very valuable Kind; it is of a duſky Lead Colour, and is one of the better Sorts of the STAFFORDSHIRE Earths. They there call it by an odd Name, white Clay; but this is becauſe it makes what they call a white Ware. This is not abſolutely white neither, but of a pale yellow; however, it is the lighteſt colour'd of any they make, ſo they give it this Name.

The Owner of a Piece of Land where this Clay is found, poſſeſſes alſo a Thing of Value. He will in a great Meaſure judge of it by its Colour, which is particular, but if it become of a pale yellow when put into the Fire, he is ſure to be right. If there be a Pottery within any tolerable Diſtance it will ſell well.

In the laſt Place is to be nam'd a medicinal Earth of this Kind; it is a black Clay of a fine Texture, which burns to a pale grey, and is good againſt Purgings, having the ſame Virtues with the Lemnian Earth and Bole Armenick.

The WHITE CLAYS are of as great Uſe and Value as any of the former. But they differ more in their Nature than any of the others: ſome of them being as tough as the pure black Clays, and tenderer than any of the other colour'd ones whatſoever.

I have mention'd juſt now a black Clay that is us'd in NORTHAMPTONSHIRE for making of Tobacco Pipes; but the Clay that is commonly us'd for that Purpoſe is white. All that is ſold under the Name of Tobacco Pipe Clay in LONDON is white; and the fine Pipe Clays of POOL in DORSETSHIRE, and of the Iſle of WIGHT, which are the two moſt famous kinds in the World, are alſo white.

The Pipe Clay of the Iſle of Wight is of a beautiful clean white, and as tender almoſt as Marle: that of Pool is of a leſs pure white, and of a tougher Conſiſtence. Neither of theſe do ſo well as a Mixture of both, which is the common Way of uſing them. The People who ſell the Clay to the Pipe-Makers, temper one with the other till they bring the Mixture to a due Conſiſtence.

The black Tobacco-pipe Clay of Northampton is carry'd as far as Oxford, among other Places, and there it is uſed for Pipe-making, mix'd with a white Clay that is dug on Shotover Hills; which laſt is a tolerable fine Clay, but has not the Conſiſtence of the Northampton Kind.

The Reaſon why I have been thus particular is, that the Perſon who finds a Clay upon his Land, which has any Appearance of anſwering the Purpoſe of Pipe-making, may not be diſhearten'd, if upon getting a Tryal made the Workmen ſhou'd tell him it is too brittle or too tough; or ſhou'd find any other Fault with it as to the Conſiſtence.

Pipe Clay is a Thing of Value, wherever it is found, for it is one of thoſe Earths that ſell at ſuch a Price they will pay Carriage: and the Owners may ſee by this, that if be of the genuine Pipe Clay Kind, it is worth Money, for mixing with others that may be faulty in the oppoſite Extream, even tho' it cannot be uſed in the Manufacture alone. He will be able to gueſs, whether it be of the Pipe Kind by this, that it is not ſo heavy and tough as the other whitiſh Clays, and is of a cleaner Colour.

There is another Kind of white Clay, which it is worth while to ſeek after, if there be any Probability of its being found in the Land; this is what the Staffordshire People call hard-fire Clay: it is of a dull white colour mix'd with a great deal of yellow.

This does not greatly differ from their Bottle Clay, which is yellow ſtreak'd with white. The principal Difference is, that in that Kind the yellow Part is greateſt in the Mixture, and in this the white.

This is of great Uſe in their Potteries, being one of their beſt Earths.

I obſerv'd it is worth while to ſeek after theſe Clays, if there be any Probability of finding them on the Land: for very often they may be diſcover'd, altho' they do not riſe to the Surface: if the Plow cutting deeper than ordinary at any time turn up a Piece of Earth of any of theſe Colours, tho' it be foul and ſandy, 'tis worth while to open a little Pit in ſome Corner of the Field, and examine how it is deeper. Very often the beſt Beds of theſe valuable Earths are foul at the upper Part from the Soil that lies over them; though they are found altogether pure at a greater depth.

The ſame Sort of white Clay that is uſed by the Pipe Makers, is alſo uſed in ſome Quantity by the Sugar Bakers, in the refining of their Sugars. They temper it to a juſt Degree, and lay it on the Top of the Sugar Pot, from whence the Water ſoaking gradually through the Sugar, carries off all Foulneſs with it. A very fine Kind of Bricks may be made of the tough white Clay, but few will be at the Expence.

Indeed he who finds a Clay of a good Kind upon his Lands, miſſes a Treaſure if he neglects to dig it. He cannot expect to know at once, all the Uſes that can be made of it: Prudence ſhould direct him to offer it to the Manufacturers of the ſeveral Kinds, that if it do not ſuit one he may have his Chance with another. And when he finds any one ready to bargain, let him take Care how he parts with his Property in the Grounds.

CHAP. II.

Of the Uſes of Loam.

I Have mention'd among the ſeveral Uſes of the Clays, that of making Bricks, of which there is ſo vaſt and ſo continual a Conſumption: but the Earth of which they are principally made is Loam.

The tough Clays are to be work'd up with Sand, Dirt, or Aſhes, to fit them for Brick-making; and the Loams are Earths thus ready prepared to their Hands, ſo that all that previous Expence is ſpared. Loam is a Compoſition of Clay and Sand made by Nature, and this anſwers to the artificial Mixtures of Clay, and the before named Ingredients.

In ſome Places the Loam is ſo favourably mix'd by Nature, that it requires only to be beat together, and work'd into Bricks; and it is a farther Advantage that this Earth uſually lies near the Surface.

It is not ſtrange this is prefer'd to the ſeveral tough Clays which are dug at greater Depths, ſo that the firſt Charge is more; and which are after this to lie expos'd to the Air ſeveral Months, and then to be made up with other Mixtures.

Where there is fine Clay there ſeldom are any Beds of Sands near; on the contrary, where there is Loam, there is commonly looſe Sand not far off. This is another Advantage, becauſe Sand is very neceſſary in Brick-making.

As Bricks are intended for different Uſes, and to be ſold at various Prices, they are made from different Materials, or at leaſt different Mixtures: the hardeſt Kinds are made almoſt of pure Clay, the ſofteſt and worſt are made of the baſeſt Mixtures, as Loam and Street Dirt: ſome are ſo bad, that they will hardly hold together.

What they call Clinkers, and uſe for the Flooring of Ovens, and other ſuch Work, are made of a tough whitiſh Clay without any Mixture.

The fine pale yellow Bricks we ſee in ſome well built Houſes, are made of the ſame Sort of yellowiſh white Clay, with a little Mixture of Sand; and theſe have four Times the Labour of the ordinary Bricks beſtow'd on the tempering them. They ſeldom are perfectly good unleſs a very large Price is paid.

The fine bright red Brick which is uſed as an Ornament about Doors and Windows in many Places, is made of a pure and unmixed Loam, which contains a large Proportion of Sand,

Sand, and that very hard and ſharp, to a ſmall Quantity of Clay.

The Manufacture of the common coarſe and cheap Bricks I have ſhewn already.

Tho' Clay alone will therefore make good Bricks, yet as many of the very fineſt, and almoſt all the ordinary Kinds are made of Loam, this was the proper Head under which to conſider them.

A browniſh Loam is moſt commonly uſed for Brick-making; and when a loamy Soil of this Complexion is too poor for Cultivation, it ſeldom fails to offer the Owner this Uſe. But as it is a very common Earth, the Queſtion will be, Whether the Situation is likely to occaſion a Demand for them: for neither the Earth, nor the Bricks, will pay any long Carriage.

A yellowiſh Loam is after this, the moſt frequent Kind uſed in Brick-making; and ſometimes it affords a Brick that is of value enough to merit Conſideration. The Owner of Land where ſuch a Loam turns up, will do well to try it in the Fire. A ſmall Piece of it will make the Experiment, and if it burn quickly to a high red, it will be worth his more ſtrict Trial, as it may afford the fine red Brick, which is always beſt when made of this Loam pure, tho' ſome uſe Mixtures.

A blue and yellow brittle Clay is common in many Parts of England, with a ſlight Admixture of Sand in it. This they make into Bricks in Oxfordshire, Leicestershire, and many other Places, and they are much better than the common Rate of Bricks in London.

In Wiltshire they uſe a yellow clayey Marle for Brick-making, and it anſwers tolerably well. It is tender and works eaſily. The Bricks are about as good as the midling Sort in London; and they are better made, for there is no Place where Work is done in ſo ſlovenly a Manner.

I have ſeen alſo a browniſh marly Clay us'd in other Counties to the ſame Purpoſe, and with about equal Succeſs. Theſe Earths work well, but the Marle is no good Ingredient, and makes the Bricks brittle.

About Newcastle in Staffordshire, they make Bricks of a brown Loam, which burns blue. Theſe have an odd Appearance, for blue Bricks are uncommon, but they are ſtrong. The Romans ſeem to have prefer'd this Earth to many others, uſing it for their Urns; many of thoſe found in Kent, and other Places, being of this blue Colour.

I infer from this, that probably the Earth of which they are made, is found in the ſame Places. This is worth ſome regard as it is of no inferior Kind for Brick-making.

Though the making of Bricks be one of the principal Uſes of Loam, and is far from being the only one. Loams of many Kinds, when they are of a due Toughneſs, which is owing to their having a large Proportion of Clay, are uſed in the Potteries of different Counties; and in other Places where they are not of a Firmneſs to enter into the Compoſition of the Body of the Ware, they are uſed in the Painting of the Outſides of the ſeveral Kinds.

In Staffordshire, where they are particularly curious in enquiring into the Nature of their Earths, they diſtinguiſh thoſe they uſe in the Pottery into two Kinds, the firſt they call throwing Clays, the other Slips.

The throwing Clays are ſuch as are tough, and will work upon the Wheel; theſe are all Clays, and they make the Body of their Work. The Slips are ſuch Earths as are brittle, and theſe they uſe in Painting and Colouring the others. Theſe are principally Loams, but they prepare them for Uſe by firſt mixing them up in Water, and letting all the Sand ſubſide, ſo that they take only the pure Clay that was in the Compoſition.

There is a grey Earth with Lumps of yellow among it, frequent in that County; the which I have ſeen alſo in Leicestershire, Warwickshire, and elſewhere; this is a dirty Loam. They prepare it as before obſerv'd; and when the pure Clay is mix'd up with Water to the Thickneſs of a Syrup, it gives the deep yellow to all their Ware.

They uſe a bluiſh Loam, which has ſo little Sand, that it might be call'd Clay, for a paler yellow, having prepar'd it in the ſame Manner.

And, finally, they uſe a great deal of a duſky reddiſh Loam, which when treated in the ſame Manner gives the black Colour.

The laſt of theſe Earths is common in half the Counties in England; the blue is leſs frequent, but I have ſeen it in Worcestershire and elſewhere. All theſe Loams may have their Value if a Pottery ſhou'd be near, and they ſhould be wanted upon the Spot, otherwiſe they do not demand much Notice.

But there is yet a Loam to be ſpoken of, which whenever it ſhall be found will be an Eſtate to the Owner, and alſo a Benefit to this Country. This valuable Kind is what they dig at preſent only at the Village of Hedgerly in Buckinghamshire upon the Edge of Berkshire. They call it there Fire Earth, and the Bricks they make of it Fire Bricks; this Name is given them from their great Strength in bearing the Fire: in London the Earth is known by the Name of Windsor Loam, and ſells at ſo large a Price as Ten Pence or a Shilling a Buſhel.

They call it Windsor Loam, becauſe it comes from Windsor to London, Hedgerly being only a few Miles from Windsor.

This valuable Earth is a true Loam, and one of the harſheſt in the World; it is of a browniſh yellow Colour, very coarſe to the Touch and brittle: being put into the Fire it becomes of a fine ſtrong red.

Theſe are the Marks by which it is to be known, and it cannot be too diligently ſearched for, the Vein of it at Hedgerly being in Danger to be worked out, from the great and long Conſumption. The Perſon who works it at preſent having dug for it all the Ground he had, took another Acre for the ſame Uſe ſome time ſince at a great Price, but on digging he has found the Bed of it does not continue.

The Uſe of this Earth is to face the Ovens at Glaſs-houſes, and for all other Service where there is a great Violence of Fire. The Chemiſts, Refiners, and others uſe it alſo to cover their Glaſſes, and other ſuch Work. And the Bricks made

made of it are the only ones to build the Ovens and Furnaces themſelves, nothing ſtanding the Fire comparably to it. This Earth whether in Bricks, or in the Coatings before nam'd, will preſently turn to a fine red Colour, and then will ſtand many Years unalter'd, where a Piece of common Loam would be run into Glaſs in a Minute.

Yellow Loams are very common: and it is highly probable, not to ſay certain, that this particular and valuable Kind is produced in other Parts of the Kingdom, beſide juſt the Spot which now ſupplies not only all this Kingdom, but ſeveral others, for a great deal of it is exported, for the Purpoſes of Glaſs-makers, Melters of Metals, and the like.

Every harſh yellow Loam may be try'd for this Uſe, comparing it firſt with the HEDGERLY Kind, and then making it into Bricks: for the Bricks made of the right Fire Earth, when properly burnt, are as red as thoſe ſoft ornamental ones already mentioned.

Not only a Bed of this Earth may be ſomewhere diſcovered to the great Profit of the Owner; but by frequent Trials perhaps a Loam may be made artificially, which will anſwer the ſame Purpoſes. The only Ingredients Nature has us'd in this are a very ſharp, hard, and large Sand, of a pale browniſh yellow Colour, and a yellow tough Clay. Now if ſuch a Sand ſhould be found in one Part of the Kingdom, and a Clay of exactly the ſame Kind in another ever ſo diſtant, they might, on being mixed in a proper Proportion, make exactly the ſame Loam that is dug in this particular Place. If the proper Kinds of Sand and Clay ſhall be once found, the Proportions will eaſily be diſcovered by making a due Number of Tryals.

Thus not only the Loam of HEDGERLY is to be ſought for in its own Nature in other Places, but Sand Pits and Clay Pits are to be ſearched on this Occaſion with a reaſonable Hope. If the Sand be found in one Place, the Clay may be found upon another on the ſame Eſtate, or in the Neighbourhood.

What makes me the more ſtrenuouſly recommend this double Search is, that in the Piece of Ground newly taken by the Man of HEDGERLY, into which the Bed of Loam does not run as he expected, there is found a Bed of yellow Clay, and another of a pale colour'd harſh Sand, which are evidently the Things of which the Loam is compos'd in the other Pit. And a Gentleman of LONDON, very curious in theſe Things, aſſur'd me, that by mixing theſe together, he had made a Loam altogether like the other, and of equal Uſe for the ſame Purpoſes.

The Sand is alſo in ſome Places found looſe in the right old Loam Pit; and there are Parts of the Vein which have a great deal of Clay, and Parts which have very little, being almoſt entire Sand, and ſcarce capable of holding together. The Workmen work all theſe together, and perhaps ſometimes mix ſome of the Sand with them; beating up all together to a due Form, which they from long Experience know by the Eye.

All this leads me to believe the Mixture may be entirely made by Art, and he will be happy who finds the Method.

CHAP. III.

Of the Uſes of Sand.

CLAY is the Earth which is employ'd to the moſt Purpoſes beſide thoſe of Huſbandry; and the next in Uſe to it is Loam: That has not nearly ſo many as Clay; and the other Kinds to be treated of, have much fewer than either. In the ſucceeding Chapters I ſhall conſider Sand and Gravel. Theſe are ſomewhat of kin to one another in their Nature, Sand being little other than a ſmaller Gravel; and Gravel little other than a larger Sand; and ſome of their occaſional Uſes are the ſame.

Where either bare Sand or bare Gravel are at the Surface taking the Place of Soil, they are not worth Culture: the Owner is therefore to enquire what Uſe he can make of them. And this will be greater or leſs according to the Situation of the Place where they lie, more than to any thing of Variation in their Kinds.

Sand is us'd as a Manure to Clay Grounds in ſome Places, and that with good Succeſs; and, as has been ſhewn: this is a Practice founded on Reaſon.

The various Kinds of it alſo are us'd to many other leſſer Purpoſes, for which they are ſeverally ſuited by their Fineneſs, Coarſeneſs, and other Accidents.

In BUCKINGHAMSHIRE the fine white Writing Sand, which is elſewhere ſold at a conſiderable Price, is ſo common, that they ſtrew Rooms with it, as in other Places they do with the ordinary yellow Sand.

In many Parts of MIDDLESEX, there is a ſmall deep yellow Kind, which feels like fine Powder to the Touch, having ſcarce any Sharpneſs. They make no Profit of it there: but the ſame Kind of Sand is ſold at a great Price at BILSTON in STAFFORDSHIRE, where there are ſome Pits of it; for the Uſe of People who caſt Metals.

Pure white Sand is us'd in making the fineſt Glaſs. It in this Caſe perfectly well anſwers the Purpoſe of Cryſtal; being better than Flints. For indeed white Sand is no other than ſmall Pieces of Cryſtal, juſt render'd cloudy by a white Earth; as the other Kinds are colour'd, and more debas'd in their Nature by yellow or reddiſh Earths.

Clean Sand, and of various Degrees of Fineneſs, is alſo uſed by Glaſs Grinders: and the finer Sorts by Plumbers for making the Bed on which they caſt their Sheet Lead.

In STAFFORDSHIRE alſo they ſift a Kind of yellow Sand, firſt from the Duſt and ſmall Pieces in a fine Sieve, and afterwards from the Stones, or ſmall Pebbles that are among it in a larger; and having thus brought it all to an even Size, they ſpread it upon Boards, and whet their Scythes on it: from this it has the Name of Scythe Sand, by which it is known throughout that County.

It is uſual to diſtinguiſh Sand into three Kinds; Pit Sand, River Sand, and Sea Sand.

The Pit Sand and River Sand have no other Difference but this, that the River Sand is well waſh'd, and the Pit Sand has often a great deal of Dirt among it. There are as many Kinds of one as of the other, and of as many Colours; but this is all the Difference, for the River Sands are waſh'd out of the Banks by the Water.

Sea Sand is often in its Original of the ſame Kind with that of Rivers, but it uſually has ſome Fragments of Sea Shells mixed with it; the Waves waſhing them to Pieces on the Shore. In ſome Places what they call Sea Sand is made up almoſt entirely of theſe. This is uſed as a Manure to Land in ſome Counties, and gives it a great Richneſs and laſting Fertility.

The common Sand when us'd as a Manure, can anſwer no other Purpoſe but ſolely that of breaking the Clay: but this which is of an Animal Nature, operates as all the other Animal Subſtances; and by its Saltneſs.

CHAP. IV.

Of the Uſes of Gravel.

THE Uſes of Gravel for Walks are ſufficiently known; but the ſeveral Kinds of it differ exceedingly in their Value. This is not owing to any Thing in the Body of the Gravel itſelf, but to ſuch Mixtures as Nature chances to have thrown among it in the Beds.

All Gravel is made up of ſmall Pebbles and Flints, but in ſome there are fewer of the Flints than in others, and in ſome Beds of Gravel there are almoſt none; and ſo of the other Mixtures.

Some Pits afford a Gravel made up only of roundiſh Pebbles of a bluiſh red Colour. Theſe look as if they had been waſh'd, having no other Matter of whatſoever Kind among them.

A Pit of this is hardly worth opening, for it is a Kind of Gravel that from its own Nature can never bind; nor is it poſſible to add any Thing, except in a vaſt Quantity indeed, that will make it. A Walk laid with this ſeems compos'd of looſe Stones, and always continues uneven, and troubleſome to walk upon; neither is the Colour agreeable.

In other Pits we find Gravel that has a great many Flints, and a great deal of Sand among it; and in this the very Pebbles are uſually of a paler Colour. This does a great deal better for all Purpoſes of laying Walks, becauſe the Flints and Pebbles not being all round come cloſer together, and the Sand fills up in ſome Degree the Crevices between them.

Theſe Gravels, however, bind but moderately; and often the Sand will be waſh'd away by hard Rains, and leave Spaces empty between the Stones.

The beſt Kind of Gravel of all, is that which is compos'd of ſomewhat irregular Pebbles, with a great many Flints, and with a good deal of a marley Loam among it. This is the fine Gravel of our Kingdom; the Loam is yellow, and gives that Colour to the whole. It alſo makes it bind tight and firm, for it fills up all the Spaces between the Stones, and the Clay that is in its Compoſition keeps them all firm, and prevents the Sand from riſing in dry Seaſons.

Theſe ſeveral Kinds of Gravel may be ſcreen'd to what Degree of Fineneſs the Purpoſe requires: and the Owner who ſees to what the Excellency of the beſt Kinds is owing, may here as well as in other Caſes, imitate Nature, and improve the others.

I would not have him undertake ſo bad a Taſk as to make a good Gravel out of the round clean Kind firſt named, by adding any Thing to it: but if his Land afford in any Part a Gravel that is pretty good; and there be a Demand for it, he may add Cent per Cent to its Value by a little Trouble.

If it be too apt to throw up the Sand in Duſt in dry Weather, let him order ſome tough Clay firſt temper'd ſoft with Sand, and Water, to be thrown and ſtir'd well in amongſt it: or if he have ſome that wants only a little more Loam, let him add it freely, this will give what they want, and convert ordinary into excellent Gravels.

Among the Gravel there are in moſt Places dug up a Sort of large ſmooth Stones of the Bigneſs of a Man's double-fiſt, or near: theſe are no other than the ſame Pebbles that are in the Gravel only larger in Size, and they are to be ſeparated for other Uſes. Gentlemens Court Yards are often pitch'd with them; tho' they make but a looſe diſagreeable Pavement.

The Value of theſe, like that of the Gravel itſelf, depends upon the Situation of the Place, and the Demand.

In ſome few Places, and particularly in Buckinghamshire, I have ſeen the Farmers dreſſing their Clay Land with Gravel. I went up to an old Huſbandman whom I ſaw aſſiſting in ſtrewing Gravel thin over one of theſe Lands, and he aſſured me it had been done by a Neighbour with good Succeſs.

The Land was a ſolid red Clay without Sand or Stone, and the Gravel was a very loamy Sort well ſcreen'd, ſo that there was not a Stone ſo big as a Walnut among it. However ſtrange the Practice might appear at firſt: for indeed it look'd as odd to me as it poſſibly can to my Reader, yet on conſidering theſe Points, it was not foreign to Reaſon.

The Stones in it were moſtly ragged little Flints, and along with theſe there was a great deal of a marley Loam: for the Loam that is among Gravel, is uſual of the marley Kind: theſe Flints broke the Subſtance of the Clay, and made way for the Sand, which broke and divided it ſtill farther; and ſo let in the Marle that enriched it, at the ſame Time the Openneſs of the Structure gave Admiſſion to the Sun, Air and Rains.

The old Farmer told me that all he ſhould do more to his Land, was giving it a ſmall ſprinkling of Dung from his Yard toward Michaelmas; and he aſſur'd me this was the Method follow'd by his Neighbour, who had by that Means got good Crops of Wheat from a Piece of Ground, which had many Years had the Character of one of the worſt Pieces of Land in the Hundred.

Gravel is one of the great Advantages we have in this Country over moſt others for making Walks; and it is from this, and our Graſs or Green Sward, which is in the ſame manner ſuperior to that of all other Nations, that we are able to add a Beauty to the Walks in our Gardens, which no other People can.

Now ſo far as regards the Gravel, this Advantage is owing in a great Meaſure to the Mixture of thoſe other Ingredients Loam and Sand among the Pebbles, than to the Pebbles themſelves. Other Countries have Heaps and Beds of ſmall Stones, but they are deficient in theſe Admixtures which make them bind.

But as famous as we are in England for Gravel, it is not in every Part that we have it, or that the People know it ſo well. They even give its Name to other Things, altogether different in their Nature.

In ſome of the moſt weſtern Counties there is hardly ſuch a Thing to be found as a Pebble: yet they have what they call Gravel. And in Northamptonshire, where they have Pebbles enough, they yet give this Name to other Mixtures. At Farndon in that County, their Gravel is made up of flat Pieces of Slate Stone more than Pebbles; the Gravel at Upton is made up wholly of ſuch Pieces of Stone, without a Pebble among them: at Ecton they call a reddiſh Sand, with ſome flat Pieces of a red Stone among it, Gravel; and at Desborough they give the ſame Name to Quantities of petrify'd Sea Shells among Sand. As they uſe theſe ſeveral Matters inſtead of Gravel, they give them its Name, but it does not properly belong to any of them.

The Gravels in England are in Colour yellow, reddiſh, brown or whitiſh: the firſt are preferr'd, but there is a particular Beauty in the laſt Kind. There are Pebbles among them of pure Cryſtal, ſome as clear as Glaſs, others leſs pure and whitiſh. I have taken up ſeveral of theſe in a Gravel Pit near the Duke of Portland's; and on one I have a Seal engrav'd: it is equal to any Cryſtal in the World.

The Gravel in Kent is often compos'd only of looſe Pebbles. In Suſſex I have ſeen a great deal made up of Pebbles and Sand only, which lies looſe in Walks, and never binds; in Bedfordshire I have met with it too loamy, and this is a great Fault. Walks made with this are dirty after Rain, and are apt to be preſently over-run with Weeds. A due Proportion of Loam and Sand, with the Flints and Pebbles, is the Perfection of a Gravel.

CHAP. V.

Of the Uſes of Chalk.

FEW of the Earths ſerve to more conſiderable Purpoſes than Chalk. It is therefore by no Means to the Owner's Diſadvantage to have it upon his Land any where: often it is a Subject of great Profit. In ſome Counties it is ſcarce, others are over-run with it. In the firſt a good Bed of Chalk is an Eſtate: and even in the others it has its Value.

A great Quantity of Lime is made of Chalk. It does not make the beſt Lime, but it calcines the eaſieſt, and can therefore be ſold cheaper, which never fails to procure Cuſtom.

The Uſe of Chalk as a Manure is alſo abundantly known, and occaſions a great Conſumption of it. In this Light it has been mention'd already under the Articles of thoſe ſeveral Soils which it is beſt ſuited to improve; and it will be mentioned more at large hereafter under the Head of Manures. It is however neceſſary to name it in theſe Reſpects under this general Conſideration. Theſe frequent Neceſſities of mentioning the ſame Thing endanger Repetitions; but it ſhall be our Care to avoid them as much as poſſible.

That the Owner may know to which of theſe two general Purpoſes Lime, or Manure in its own State, his Chalk is beſt ſuited, he muſt examine its Nature. A ſmall Degree of Care will diſcover this; for in general, he will find the hard and ſtony Chalks are fit for Lime; and the ſoft and marley ones for Manure in their natural Form: I ſay in their natural Form, becauſe the hardeſt of them when reduced to Lime, ſerve alſo for Manure.

Theſe are Articles no farther to be conſider'd in their Place: and the preſent Chapter will be the ſhorter, becauſe of the Neceſſity of treating largely of the Subject elſewhere.

Whiting, which is of ſo many Uſes in the common Affairs of Life, is made from Chalk. It is no other indeed than Chalk broke from its hard and firm Nature, and reduced to a fine Powder like Flower, which having been ſuſpended in Water, forms itſelf into Cakes as that Water dries away; and is fit for the Uſe of the White-waſher and others.

Chalk is alſo valuable on Account of its Qualities as a Medicine. They find in Chalk Pits certain roundiſh ſhelly Subſtances, which they call Chalk Eggs. Theſe are hollow, and full of a Chalk as fine as Whiting, and altogether like it. The Curious ſay theſe Shells once belong'd to the Sea Eggs, or Sea Urchins, as they are called, a Sort of Shell Fiſh common enough on our Shores; and that they have been petrified and filled thus with fine Chalk ever ſince Noah's Flood.

I have been told that the Chymiſts and Apothecaries uſe Chalk oftener than they ſhould: and that thoſe white Cakes that are ſet up in Glaſſes at their Windows in London, with the Name of Pearls, and the like, are only Chalk. They look very like little Whiting Balls: very probably they are no other. How far this Deceit is prejudicial to the Healths and Lives of thoſe that take them, I ſhall not enquire; not being willing to ſpeak of Things I do not underſtand.

They are very happy in Kent, and ſome other Counties, who have the Chalk lying juſt under Ground, or in the Cliffs, ſo that they have nothing to do but to tear it down and uſe it. In many other Counties where they have as much Neceſſity for it, it lies at great Depths.

In ſome of theſe Places they dig Wells for it, there being no Water till they come to a great Depth, ſo that they take up a vaſt deal without

out Disturbance. In other Counties I have seen them digging for it as they do in Mines, and drawing it up in Buckets: in such Places it bears a Price.

They have a very ingenious Method in some Parts of Kent, of getting down their Chalk where it is in the Cliffs, or on the Sides of Hills, which is well worth practising in all other Parts where this Commodity lies in a like Situation. In the first Place, they undermine a Parcel of Chalk to a little Depth at the Bottom. When this is done, they go to the Top and cut a small Trench along, as far from the Edge as the Depth of the undermining: they fill this Trench with Water in the Evening, and the Effect is, that a great Flake of Chalk of two Foot or more in Thickness, and of the whole Breadth of the Pit falls off before Morning. This does best in the hard and stony Chalks.

We hear of two other Kinds of Chalk among the Painters, the one called black Chalk, and the other red Chalk. It might be suppos'd that these were common Chalks ting'd to those Colours, but that is not the Case: they are altogether different Substances, and are found not in great Beds, but in Lumps: where they happen to be thrown up in diging, they are worth saving; but there is no knowing where to expect them.

Hitherto we have been considering those Substances which frequently make the Foundation of Soils, as they are useful to other Purposes beside those of Husbandry. We have in this Light gone through five of these: there remains one more, that is, Mould; but as the natural and immediate Use of that is for Husbandry, it would be idle to consider it in other Lights.

It will be proper therefore that we now advance to certain other Substances, which the Owner may find either by Accident, or by his Industry in his Land, and which may be very profitable.

CHAP. VI.

Of Fullers Earth.

IT would be natural in this Place to give the Preference over all other Things here to be treated of, to Marle: as it is more frequent than the others, more abundant in Quantity wherever found, and more generally useful; but that will come into Consideration in another Place, under the Article of Manures: and to avoid any Repetition, nothing shall be said of it here. I shall therefore proceed to treat of Fullers Earth; a Commodity of Value, and of the utmost Importance in that great Article our Woollen Manufactory. It is not only an Advantage to the Owner who shall find this on his Land, but to the Country.

Fullers Earth is at present dug in very few Parts of this Kingdom: but wheresoever it is found the Profit is very great. The Nation is at this Time in a Manner supplied from a few Pits in Bedfordshire; but I have more than once met with this valuable Earth in other Counties.

In the first Place, let those who may reap the Advantage of it, know perfectly what it is. Fullers Earth is a genuine Marle, and is the finest of all the known Kinds. If the Price would allow, doubtless it would exceed all other Sorts in the Improvement of Land; none is so pure and free from Admixture, none is so soft and mellow; and as to its breaking with the Weather, we know very well that it falls to Powder in a few Moments by the Effect of Water.

Tho' Fullers Earth will never be used as a Manure, yet even the Knowledge of it is not without its Use: for foul and coarse Fullers Earth is found in Places where the fine and pure is not; and the Owner will now know how to value it.

I mention'd the Buckinghamshire Farmer's dressing his Ground with Gravel. I have in many Places found a coarse Kind of Fullers Earth in Gravel Pits: I cannot say I distinguish'd any of it in the Parcels of Gravel I saw there; but if there were any Quantity of it as there might be in other Depths of the Gravel Pit, we see the Fertility in part accounted for on this Principle. I thought at that Time this Farmer deserved particular Praise for doing what so few of his Profession ever will, and especially of the old ones, that is, use a new Method.

What I mean by a coarse Kind of Fullers Earth found in Gravel Pits is this. There often lie among the Gravel in different Counties, Lumps as big as one's Fist, or of half that Bigness, of a greyish coarse earthy Substance. Sometimes I have seen these lie irregularly, and in some Places I have seen a Streak of them in the Side of the Pit run perpendicular; though seldom in an exact strait Line from the Top of the Bed of Gravel down as far as the Workmen dig.

This coarse Earth when examin'd, contains usually a sharp Sand, and some Clay, but it has a soapy Softness withal, that to a Person used to handle Fullers Earth, will be sure to bring that into his Mind.

I have put these Lumps many Times into Water, where they break almost directly, and they form three Settlements. At the Bottom there lies a sharp Sand, over that is a thin Settlement of yellow or brown Clay, and at the Top of these a loose Covering of an Olive colour'd light, crumbly and moulding Matter, which is perfectly the same with Fullers Earth when broke in Water. If the whole be shook or stir'd together ever so often, the Settlement always divides itself into three Parts in this Manner.

Now I am sure from many Trials, that this upper Settlement which looks so like Fullers Earth in a State of Wetness, is Fullers Earth in Reality; upon this it will be worth while to make some Observations.

In the first Place, where should any Thing be expected to be found pure and entire, but where we already see it in a more imperfect State. Therefore in whatever Lands these Lumps shall be found, it would be well to look heedfully all over them for more and finer, in order to direct a better Search by digging where there is a Prospect.

Secondly,

Secondly, where there are Beds of any Kind of Earth pure at ſome Depth, we ſee the ſame Things in a fouler State towards the Surface: thus clayey Soils generally lie over Beds of pure Clay; theſe Soils being no other than the ſame Clay which will be found pure at a greater Depth, mix'd with other Earths near the Surface: and it is the ſame of the others.

Therefore when we find this foul Kind of Fullers Earth near the Surface of the Ground in Gravel Pits, it is very reaſonable to believe the ſame Subſtance may be found altogether pure and entire, deeper down.

I would not adviſe for this Reaſon, the diging in Search of Fullers Earth wherever ſome of theſe Lumps ſhall be found, becauſe that would be a random Search: ſuch Marks of valuable Things under Ground, being often ſcatter'd to a great Diſtance about the Surface. But when the Owner of a Piece of Land ſees one of theſe Veins I have ſpoken of, running ſtrait down a Gravel Pit to the Depth of the diging; I think it would be worth while to venture ſome Expence in following it deeper; and ſeeing in what it ends.

The Miners often trace a Vein of Ore in this Manner through the hardeſt Rock, from the Thickneſs of a Thread till it enlarges into a great Body; why ſhould not the ſame Succeſs attend ſuch a Trial here.

I remember once to have ſeen in a Gravel Pit upon my own Land, a Vein of fine Mould thus running ſtrait down among the Stones. This did not begin ſmall and increaſe in Bigneſs; on the contrary, it was wideſt at the Top or Surface of the Ground, and grew ſmaller all the Way. I had ſeen theſe before in other Places where I had no Right to dig; but here I order'd it to be follow'd. At about thirteen Foot it terminated in a thick Bed of Garden Mould. The whole Deſcent ſeem'd to have been a Kind of Funnel, through which this Mould ran into the hollow underneath, filling it up, and forming a Layer of Mould, a Thing very unuſual at that Depth.

I mention this to ſhew how well ſuch a Vein of Fullers Earth, if one ſhould be met with, would be worth following. We know nothing of the Ways by which People were led to the Knowledge of thoſe Beds that have ſo long been dug for Fullers Earth: perhaps it was in ſome ſuch Manner.

Of this I am ſure, that if the Farmer or Owner would frequently follow the Plow and the Spade with his Eye, he would find great Advantage.

This is not all the Reaſon we have to expect Fullers Earth in other Places, beſide thoſe where it is at preſent dug.

At WENDON in NORTHAMPTONSHIRE, there is found in many Pits, an Earth of an irregular and mixt Colour, yellowiſh in ſome Places, and bluiſh in others. This breaks in Water juſt like Fullers Earth, and takes Spots out of Cloaths, as the People every Day experience. It is not altogether pure, nor does it ſeem of quite ſo ſcouring or penetrating a Nature as Fullers Earth: but it comes very near it, and ſerves in its Place for ordinary Purpoſes.

Now blue and yellow mix'd, every one knows make green. Theſe dingy Earths therefore would probably when mix'd, make an olive Colour; and if pure, would more reſemble Fullers Earth. This is not the only Place where I have ſeen this foul and half-mixed Earth: is it not very probable that the ſame Earth more pure and better blended is to be found a little deeper. Such a one would be right Fullers Earth; but no-body digs to try.

Dr. PLOT in his Natural Hiſtory of STAFFORDSHIRE, ſays, That near STATFOLD in that County, he had met with Fullers Earth very much like that of WOOBORN in BEDFORDSHIRE, but in little Quantity. Now if ſome broken Maſſes of this lie near the Surface, who will doubt but there are more at greater Depths. Probably there are Beds of it there, and in the other Places I have mention'd, and there only wants Induſtry and Spirit to open the Way to a Fortune.

I would adviſe the Land Owner and Farmer for the future, to make themſelves well acquainted not only with Fullers Earth, but the others to be named hereafter, by the Sight and Touch; that they may know when any Thing like them happens to be thrown up: I ſay any Thing like them, for they are not to expect to find any of theſe Commodities pure and perfect when near the Surface: they can only expect coarſe Pieces there which may tempt them to ſeek farther; they are to expect no more than this, for it is all Nature gives for their Information.

CHAP. VII.

Of Ochre.

OCHRE is an Earth uſed by Painters and many other Artificers; and is of very conſiderable Value. Many fine Kinds of it are produced in ENGLAND, and that in very large Quantities. It is an Eſtate to the Owner whereever it is found; and I am ſenſible, that it is to be dug in many Places, where at preſent the Poſſeſſor of the Ground has no ſuch Expectation.

Ochre is of ſeveral Kinds: the two principal are yellow and red. A great deal of the yellow Ochre is converted into red by burning, for all yellow Ochre grows red on being put into the Fire: but beſide this, there is natural red Ochre in Abundance.

Beſide theſe two principal Kinds uſed by the Painters, of each of which there are ſeveral Subdiviſions; there are two others uſed by Glovers in ſome Parts of the Kingdom, and not ſo well known as they deſerve to be: in others there are a purple and an aſh-colour'd Kind; and to theſe four I may reaſonably add a fifth, which is of a duſky Straw Colour, and ſerves for the rubing upon Leather Breeches, and Buff Belts.

It is not to be imagin'd, that every colour'd Earth is an Ochre: on the contrary, an Ochre is an Earth of a diſtinct Kind from all others. As Clay differs from Chalk, and as might be inſtanced of many others; ſo Ochre differs in its very Nature from any other Kind that can be named. There are indeed clayey Ochres, but

they are the leaſt valuable Kinds. Ochre in its proper Condition, is light, brittle, duſty, and fine between the Fingers; and ſuch are all thoſe I have named.

As to the yellow Ochre, which is the moſt univerſal Commodity, that is dug principally on Shotover Hills near Oxford: not only all England, but all Europe is in a Manner ſupplied from this Spot; but the Owner of a Piece of Land where Ochre ſhall be found, needs not for this neglect digging it. For tho' People are principally ſupplied from Oxfordshire with it; a great deal is ſent to London from other Places; and wherever it ſhall be found, a Market may be had for it.

The ingenious Dutch have a great deal of our Ochre from Oxfordshire, which they partly uſe for their own Purpoſes, and partly ſend over to us again after they have manag'd it different Ways, under the Name of foreign.

Yellow Ochre uſually lies under Beds of Clay and Sand: but it generally diſcovers itſelf by Lumps lodg'd here and there among thoſe Beds: ſo that when ſuch are found among Clay or Sand, of a good Colour, and in any Quantity, it is worth while to be at ſome Pains and Coſt to ſee farther.

The yellow Ochre is divided into two Kinds in theſe Pits, one called Stone Ochre, and the other Clay Ochre; one is ready for Uſe juſt as it is dug, being naturally pure and fine; but the other is foul and irregularly colour'd; ſo that they ſoak it in Water to get out the Sand, and then beat it into Cakes.

In many Places yellow Ochre is found in little Lumps among Gravel, and of different Colours. They pick ſuch up in Bedfordshire and other Counties, and the Glovers uſe it. I have often ſeen this of fine Colours.

In Northamptonshire, and ſeveral other Counties, they have grey or aſh-colour'd Ochre; the purple is not ſo common, but they find it in the firſt mention'd County. Particularly in a Pit at Thingdon, there is a thin Stratum of it. 'Tis us'd only by the Glovers, and therefore ſells at a ſmall Price: but it is worth the Notice of Painters, for it is a beautiful Colour, not unlike what is called Perſian red; and mixes well with Oil as I have tried many Times.

It is not difficult to make a gueſs where Ochre is under the other Beds, by theſe Tokens it gives of itſelf nearer the Surfaces; and 'tis often worth the purſuing at ſome Expence. But it is not only the Want of attending to theſe Marks, that is to be charg'd upon many of the Owners of Lands, I have known a Bed of yellow Ochre cut through in diging for Water; and neither the Farmer nor Landlord have known, that the yellow Matter they ſaw thrown up was of any the leaſt Value.

The Chapter of Ochre is not to be cloſ'd without mentioning what is called Reddle. This is not indeed properly of the Ochre Kind, but a Marle of a deep and ſtrong red Colour; but as it is vulgarly called an Ochre, and by ſome red Ochre, as if there were no other, it was neceſſary to mention it here.

The fineſt of this Reddle, and the greateſt Quantity, is dug in Derbyshire, from whence it is ſent to London, and to other Parts of the Kingdom, where ſo large a Quantity of it is us'd, that tho' it ſells at a ſmall Price, the Value is upon the whole very conſiderable.

Beſide the common Uſe in marking of Sheep, this Earth is put to many others among the Colourmen, being the Foundation of a great many of thoſe Compoſitions that ſerve for large Work.

CHAP. VIII.

Of Peat.

PEAT, or as it is called in ſome Places, Turf, is a very particular Subſtance. It is ſufficiently known by Sight in the Places where it is burnt, for it is the common Fuel of many Counties; but I have found many even in thoſe Places ſtrangely ignorant of its Nature: and thoſe in remote Counties very little acquainted with it more than by Name.

It is not much a wonder that thoſe who never ſaw Peat except in the dry State, ſhould be ignorant of its Origin. It then is of conſiderable Hardneſs in many Kinds; but the moſt ſolid Peat cuts eaſily with a Spade in the diging, being ſoft and tender there, though it get Firmneſs in drying.

Peat, or as it may be called Peat Earth, diſtinguiſhing that which lies on the Ground from that which is dug, conſiſts of a bituminous Matter, full of various Parts of Plants. For this Reaſon when cut up and dry'd, it readily takes Fire, and burns very freely.

It is of two Kinds. The one is taken from the Tops, the Sides, or the Bottoms of Hills; the other is dug up in a level Country. The Peat of Lancashire is of the firſt Kind; and that of the Fens, as of Lincolnshire, and the like Places is of the other. They differ in Colour, that of the hilly Countries being pale; and alſo in Conſiſtence, as it is ſomewhat ſofter. The Peat of the Fens being compact, of a deep blackiſh brown, the other lighter, looſer, and of a paler Hue.

Theſe are but trivial Differences, and in all other Reſpects they are perfectly alike. The bituminous Matter is the ſame in both, and the Parts and Remains of Plants are of the ſame Kind, and preſerved in a like Manner.

It is in many Places of great Conſequence to the Owner of Land, to know whether Peat may be cut in it. This, as it lies ſo near the Surface, and as the Soil about it uſually ſo eaſily diſcovers it, is not ſo often over look'd as Ochres, and the reſt of thoſe valuable Earths that are hidden at greater Depths; yet I have ſeen where a great deal has been loſt by not attending to theſe obvious Diſcoveries of Nature.

Let all thoſe therefore who live in Places where Peat is at all likely to be found, acquaint themſelves with its Nature, with the Marks of the Soil that contains it, and with its Value. That they may judge where it is lodged, and whether worth taking up.

The Fen Lands are the Places where Peat is moſt frequently found, yet it is not univerſally

laid under all fenny Soils. Some Parts of the Fens in the Iſle of Ely, in Lincolnshire, and Northamptonshire, afford it in great Plenty and Perfection. Other Parts of the ſame Fens none at all. Very frequently the Farmer lights on it in digging his Ditches, which are the common Fence in that Country: and then the Peat very well pays for all the Labour of digging.

The right Peat Earth is a light ſpungy tough Subſtance of a blackiſh, or a darker, or lighter brown Colour. It is full of fibrous Roots of Plants, together with flaggy Leaves, and hollow Stalks like Reeds; and has often many other Parts of Plants in it. Theſe Vegetable Matters are ſo abundant in the Peat Earth, that it ſeems as it were compos'd of them.

It lies at ſmall Depths in the Earth, but never on the Surface of it, as ſome from the Name Turf have been idly led to imagine.

It never lies immediately under the Turf or Sward, but always has a greater or leſſer Depth of the Soil between. This Soil is commonly the black moory Land, or pure Mould of the Fens; and this is ſo unlike in its Nature to the Peat itſelf, that if it be taken up with it, as is ſometimes done in the Cutting, and Peat be laid to dry with a Quantity of the Mould upon them, it always falls off.

Good Peat Earth, as it lies in the Ground, cuts ſoft and eaſy, ſo that they form it into Shape as they dig it. When dry'd, the Peat are tough and firm, they are not eaſily broken, and the bituminous Part between the Stalks and leafy Remains of Plants is very hard, and where it is broken, looks ſmooth and gloſſy like Pitch.

The blacker the Peat is, the better it is always reckon'd: 'tis for that Reaſon the Peat of the Fen Lands is preferr'd to that of hilly Countries. When it is of a pale brown, or reddiſh and ſoft, it does not burn ſo well. Sometimes there is Clay or other Earth among it, and then it is of very little Value.

It is uſed as the common Firing in Fen Countries, and burns agreeably enough: it has ſome Smell; but that is accounted wholſome.

Peat is juſt of a contrary Nature to Manure. When the Surface of it is laid bare, nothing grows on it, except ſometimes a few Ruſhes; and when the Soil that lies over it is plowed, the Farmers take Care never to cut upon the Turf or Peat if it lie ſhallow; for they affirm from Experience, that its Mixture with the Soil renders it barren.

A ſoft ſpungy Soil, ſhaking as it is trod, with a good black Mould under the Turf, is the Mark of Peat Earth underneath. Not that it is always in ſuch Lands, but that is its uſual Situation.

It is found from a Foot to four or five under the Surface, and often the Moor or Bed of it is of conſiderable Thickneſs. It retains wet a long Time, and therefore is ſo eaſy to cut in the Bed; for when dry it becomes hard and ſtubborn, as before obſerved.

The beſt Seaſon for cutting Peat is April and May: and the Peat muſt be cut larger than they are expected to be when dry, for they commonly ſhrink one fourth Part in the drying.

The uſual Situation of Peat is this; firſt there is a heavy thick Sod, that gives Way under the Feet; then a moiſt black moory Soil, of a Foot or more in depth; then comes the Peat, which is two, three or more Feet in depth; and under this is a Bed of Clay.

This is the Reaſon the Peat keeps ſo moiſt in the Pit. The black light Soil lets Wet eaſily through; and it freely penetrates the Peat, but the Clay at Bottom ſtops it, ſo it ſwells, grows ſpungy, and lifts up the Soil, making it ſhake and give Way on treading.

The Graſs over the Peat Moors is uſually coarſe and harſh; and where the Peat Moor is thickeſt, there the Graſs is always worſt. Where this Moor or Bed of Peat is very thick, as it will be in ſome Places five Foot or more, they don't cut the whole but only the upper Part, two or three Feet at fartheſt, into Peat. The under Part is uſually in theſe thick Beds too moiſt for Uſe.

In ſome Places there is a Bed of Sand inſtead of a Bed of Clay under the Peat Moor; but this is not ſo common, nor is the Peat uſually ſo good where this is the Caſe, as where there is a firm Clay.

In the Fens they have two other Sorts of Fuel of the Peat Kind, but inferior in Value, the one they call Seſs, and the other Hods.

The Seſs is cut from the upper Part of the Beds of Peat. It conſiſts of a light brittle Earth, with little of the black Bitumen in it, but with the Parts of Plants in the ſame Manner as the other. The Hods are cut out of the loweſt Part of the Peat Bed; but it is not every Peat Bed that affords either. The Seſs only lies on the drier Moors; and the Hods, which ſtink in burning, come from the moiſt Bottoms of thick Beds.

This Bed of mix'd Matter, partly bituminous and partly vegetable, which forms the Peat, has been ſuppos'd owing to the Sediments of great Floods, which have remain'd a long Time upon the low Lands; but that is not the Caſe. Bituminous Matter, like Pitch, does not ſettle from Floods: beſide the ſame Matter is found in the ſame Form impacted with Roots, and making regular Beds of Peat Earth at the Tops of Hills and on their Sides; and theſe are Places that can never have been overflow'd.

From this I mean to encourage the Farmer, not to ſuppoſe Peat is to be found only in one Situation; but wherever he finds a Piece of Ground that ſhakes under his Feet, and is covered with coarſe Graſs, and that has a black Mould under the Sward, to dig a Foot or two, and ſee whether he do not find Peat Earth at that Depth.

It is a Fuel very well worth uſing wherever it can be had, it heats Ovens better than any other: it is cheaper than any, and its Aſhes are valuable as Manure, though in its natural State it is of all Things the moſt an Enemy to Fertility.

One ſingular Uſe of Peat is the keeping an Fire a great while; a Piece of it lighted at one End, and diped in Water at the other, will keep fire all Day.

It

It is excellent for many of the nicer Chymical Operations, and if it were to be had univerſally, would be called for more than is imagined. I would therefore have him who can dig it, not be negligent becauſe it is not known or commonly us'd about the Place. Let him dig and dry it, and he will ſoon find Buyers.

What may tempt the Owner of Land to ſearch for this valuable Commodity more generally than is done at preſent, is, That I can aſſure him from my own Experience, that other Places beſide Hills and Fens afford it. I have ſeen it cut through in many Meadows, when they were only diging the Trenches to drain them; and no-body regarded it. At Mears Ashby in Northamptonshire, and at Grafton Underwood in the ſame County, they dig excellent Peat, though quite out of the Fens, and far enough from the Hills: it lies at about fifteen Inches under the Sward, with a rich black Mould between; and runs to a great Depth. The only Mark of its being in theſe Paſtures, is a little Unfirmneſs of the Ground, and this may lead the Owner of Land to ſeek for it in many Places, where the Situation does not naturally, at leaſt according to the common Opinion, make it expected.

At the ſame Time that I recommend the Search of the right Peat in Places where it has not before been found, it is proper I caution the Undertaker againſt uſing his Labour upon a wrong Sort, which has been lately try'd in ſome Places. I don't know whether it was from Ignorance of what Peat truly is, or from a Suppoſition that Turf, or the outer Covering of boggy Land would do as well: but Thomas Renolls my Neighbour cut the upper Turf of a boggy Ground into long ſquare Pieces like Peat, and dry'd them for burning. He told me, when I repreſented the Folly of this Project, that a Relation of his had done the ſame ſucceſsfully.

Whether his Relation told him what was falſe, or he did not underſtand him, I cannot ſay, but the Event was what might be expected: the Turf was light and fuzzy, and did not burn well, nor was worth any Thing. It was much like the Seſs already deſcrib'd, only worſe. Theſe wet Places are always cover'd with a Turf that is very full of Roots, but there is none of the bituminous Matter. So that this is not Peat, but quite another Thing: neither was there upon Trial found any Peat Earth at the Bottom of this Bog.

It is proper I here warn the Perſon who ſhall find Peat on his Land of another Error. It is commonly ſuppoſed the Peat Earth grows: but this is a Miſtake. When he has once cut up the Quantity any Place yields, he muſt not expect any more for ever.

In Lincolnshire where they dig great Quantities, when they have cleared one Dike as they call it, they open another: and they throw into the firſt the Turf and Mould out of the other. It is pretended this will yield more Peat in twenty Years, but I have ſeen it try'd after twenty five or thirty Years, according to good Authority, and without the leaſt Succeſs, when the Peat Bed is once dug up it never is renewed.

The curing of Peat is a Thing of no great Difficulty, they are cut in the firſt Summer Months in the Shape of large Bricks, and are laid ſingly upon the Earth to dry. They are very ſoft when firſt dug, but they ſoon loſe part of their Moiſture, and harden in Proportion. They are to be turn'd twice or three Times while they lie ſingle, and after they have thus got a tolerable firſt drying, they are to be piled up in Heaps like a Wheelright's Felleys, with Spaces for the Air to blow in between: in this Manner they get thoroughly dry, and are fitted for the Fire.

The Huſbandman muſt keep in Mind the Difference between Peat, and the common Turf of the Ground, not only for Fuel, but as us'd for Manure: for as the Peat is much ſuperior to any Kind of upper Turf for Firing, ſo on the other hand, the upper Turf of moory Ground is better for burning to Aſhes for Manure than Peat.

End of the Appendix to the First Book.

A

COMPLEAT BODY OF HUSBANDRY.

BOOK II.

Of MANURES. In TWO PARTS.

I. *Of* NATURAL MANURES.

II. *Of* ARTIFICIAL MANURES.

The INTRODUCTION.

Of Manures in general.

AFTER a thorough Conſideration of the Soil, both with reſpect to its Cultivation and other Uſes; it is proper we lead the Farmer to the Underſtanding of Manures, by which the Improvements of Cultivation are in a great Meaſure brought about: the breaking the Land by the Plow, and the altering and enriching it by theſe Dreſſings, being the two Articles on which all the Amendment of a Soil depends.

The Buſineſs of the ſucceeding Book is to treat of Manures; and that not ſlightly or imperfectly. Care ſhall be taken to draw together the whole Number of theſe; to arrange them naturally, and preſent them one by one before the eye of him who is to uſe them.

Nor ſhall we be content with informing him of the Effect each has upon that Kind of Land to which it is ſuited; but he ſhall know how it acts: informing his Judgment, inſtead of truſting all to his Memory.

This is our Deſign in the preſent Part of the Work: we are ſenſible that the Undertaking is large, as well as difficult; but we have been favoured with ſo many Communications upon the Subject, that we hope in ſome Degree, to proportion the Execution to the Deſign.

In treating on the ſeveral Manures, many muſt be call'd up again which have been nam'd already; but we hope the Caution that has been uſed in methodizing the Papers, will prevent tedious or needleſs Repetitions.

In the Arrangement of theſe ſeveral Articles, we ſhall firſt make a general Diviſion into the natural and artificial Manures: among which, the Uſe now made of ſome of the natural Kinds would have appear'd as ſtrange to an earlier Practitioner in Huſbandry, as the Invention of many of the others.

In treating of the Uſes of the ſeveral Kinds, and their proper Application, we ſhall throw aſide Theory and Conjecture, building all upon Experience. If the Farmer be not perfectly inſtructed as to the particular Kinds of Lands which demand particular Dreſſings, it wou'd have been better for him if thoſe Manures had never been invented.

A Soil may be render'd worſe than it naturally is by bad Management; as certainly as it may be improved by good: but as we ſhall inſert nothing here but what is ſupported by repeated Experience, we wiſh the Farmer to prove ſo much his own Friend, as to give what may appear ever ſo new to him, if it ſuit his Purpoſe, a fair Trial.

BOOK II. PART I.

Of NATURAL MANURES.

CHAP. I.

Of the Nature of Marle.

IN treating of the natural Manures, 'tis fit we begin with the moſt conſiderable, which is Marle. It is indeed in all Reſpects ſuperior to the Generality of the others: it ſuits many different Kinds of Lands; and its Effects in rendering them fruitful are not more ſurprizing than they are laſting.

Marle is a Treaſure to the Farmer whereſoever it is found; and there is no Country in the World where there is more of it than in ENGLAND: yet there are few Places in which it is known to lie. The Induſtry of thoſe who deal in Huſbandry has not been in any Thing ſo ſlack, as in the Searching after this valuable Commodity.

We ſhall endeavour to awaken them to a Senſe of their Intereſt, by ſhewing its Value: and to aſſiſt them in the Search after it we ſhall endeavour to make it known to them by Sight and Feeling in its ſeveral Appearances, for theſe differ greatly. After this, to prevent Miſtakes in the Application, the ſeveral Kinds of Marle ſhall be diſtinguiſh'd, and the particular Kind of Land ſhewn, to which each properly belongs.

In looking into what has been formerly known concerning the Marles, one is ſhocked to ſee that Huſbandry has declined in this material Reſpect in ENGLAND. Our Anceſtors two thouſand Years ago were well acquainted with their Poſſeſſion of this Treaſure, and its Uſe. The old Latin Writers celebrate the Marles of ENGLAND, and tell us that the Lands were greatly enriched by them. They enumerate ſeveral Kinds: and ſeem much better acquainted with their Nature and Qualities, than the Generality of our preſent Farmers.

We ſee what Treaſures Marle Pits at this Time prove where they are open'd, and what Advantage the Land has from that Dreſſing. Let us endeavour to find them in more Places, and make that Benefit univerſal.

In order to the Huſbandman's finding Marles upon his Land, he muſt firſt have ſome Knowledge of them. The very fineſt Kinds have often been thrown up accidentally in digging on other Occaſions, and no one has known them. The Fields have languiſhed for want of what they contain'd in their own Bowels thro' the Ignorance of their Owner.

Marle is of ſeveral Kinds, and differs greatly in Appearance; but to him who will carry a general Knowledge of it in his Head, it may be always known in whatever Form.

Marle, like other Earths, may be pure or foul: for thoſe Beds of Matter which lie in the Earth are ſubject to Mixtures as well as thoſe on the Surface, tho' not ſo frequently: and the deeper Marle lies, uſually the purer it is.

We ſhall firſt then divide the Marles into two Kinds, the pure and the mixt. The pure Marles all agree in their Texture; their Difference being only in the Degree of Hardneſs, and in the Colour.

Pure Marle is a Subſtance not unlike Fullers Earth. It is ſoft and fatty to the Touch, it is not tough like Clay, nor duſty like Ochre, nor ſandy like Loam, but is of a tender fine Nature, unlike all other Sorts of Earths.

When a Farmer finds a Piece of Earth of this Kind, whether it be thrown up in digging a Well, or by whatever other Accident, let its Colour be what it will, he may depend upon it 'tis a Marle. In order to be more confirm'd, let him throw a Piece of it into a Baſon of Water, and he will find it ſwell like Fullers Earth, and crumble in the ſame Manner of it-

ſelf

ſelf to Pieces. This is a certain Confirmation. The harder and more compact Kinds break ſlower, the ſoft and looſe ones quicker: ſome almoſt immediately. But in whatever Manner it happens, this join'd to the others is a ſure Proof that the Earth under Examination is a Marle: and let him who has fallen by Chance upon a Piece of it, dig in Search of the Treaſure.

CHAP. II.

Of the ſeveral Kinds of pure or unmixed Marles.

OF theſe pure Marles there are four principal Kinds, diſtinguiſh'd according to their Colours.

A white, A red,
A yellow, A blue;

there is alſo a black, but it is leſs common.

Theſe are to be diſtinguiſh'd under the Name of pure Marles of thoſe Colours; for there are of the foul and coarſer Kinds of the ſame Colours.

I have Experience on my Side in ſaying, that theſe excellent Marles are all more common than is ſuppos'd. I have ſeen the blue Marle thrown up in BUCKINGHAMSHIRE, and the red in Abundance in WARWICKSHIRE, as fine as the beſt in SUSSEX or KENT. And not very many Years ſince in WORCESTERSHIRE, as much white Marle was diſcovered among the Rubbiſh where they were ſinking after Salt Springs, as returned a great Part of the Expence.

In ſhort, though there are but a few Counties in which Marle has been found, and is in Uſe in ENGLAND, I believe there are very few where it may not be diſcovered; nor is any Thing ſo well worth the Search.

There are found in different Places Marles of theſe ſeveral Colours, varying in their Texture and Hardneſs; but, in general, the white or whitiſh are the ſofteſt and lighteſt, and the blue are the firmeſt and heavieſt.

For this Reaſon the white is generally uſed for Paſture Grounds, and the blue for Corn Lands. This is the general Practice in KENT and SUSSEX, where the Marles are moſt frequent, and their Uſe is beſt underſtood; the white being there almoſt univerſally of a looſe crumbly Texture, and the blue of a more compact and firm.

This Cuſtom however is not to be eſtabliſh'd into a Law to the Farmer. Tho' in thoſe Counties where they have Choice, they uſe the ſofteſt Marles for Paſture, becauſe they diſſolve the moſt freely; and the harder for plow'd Lands, where they are more aſſiſted by Tillage. The Farmer, who has either of theſe Kinds, may uſe it indifferently on both Occaſions, in this Manner.

If it be the blue firm Kind, or any other of the compact Sorts, let him lay it upon his Corn Land early in the Seaſon, that the Weather may mellow it before the laſt Plowing: if it be for Paſture Ground, let him in the ſame manner lay it on in Time, ſpreading it thin. If it be the white, or any other of the looſe and crumbly Kinds, it need not be laid on either till late, becauſe it breaks and diſſolves almoſt as ſoon as it is expos'd to the Weather.

The Colour of Marle is no certain Proof of its compact, or crumbly Nature; but, in general, the blue is firmeſt, the white ſofteſt, and the red and yellow are of a middle Degree between both.

At BLUNDS-COURT, and in the Pariſh of SHIPLAKE, both in OXFORDSHIRE, there is dug a whitiſh Marle, of the fine crumbly Kind. It is uſed both on Corn Lands and Paſture Grounds with great Succeſs; and they lay it on at any time of the Year they pleaſe, for it melts into the Earth like Cream, almoſt as ſoon as it is ſpread.

In ſeveral Places in WARWICKSHIRE I have ſeen a blue Marle, the ſame that is ſo much eſteemed in SUSSEX. This is at firſt as firm as Clay. This Kind ſhould be laid on Corn Lands at the Beginning of Winter, that it may be broke by the Froſts and Rains.

I have mentioned that the Uſe of Marle was well known in Huſbandry in this Country in the Time of the ROMANS. There is alſo plain Proof that it has been uſed long ſince that alſo in many Places, where the Farmers know nothing of it now. A melancholy Proof that the Art of Huſbandry, which is ſo well worthy to be improved, has declined inſtead of advancing in the late Ages.

As an Inſtance of this Uſe of Marle in Places where though it is wanted, it is not employ'd at preſent, I may cite the common Report of the People of NORTHAMPTONSHIRE. In CRICKFIELD in that County, there are a great many old Hollows, which they at this Time call Marle Pits or Marlow Pits, and ſay were dug for Marle. In the Lordſhip of WINWICK, in the ſame County, are many other ſuch Holes, all which the Country People have heard their Fathers ſay were dug for Marle to improve the Land: and old Deeds of Eſtates mention Marlaria, or Marle Pits, as Articles of Value upon them.

In the ſame Manner I have ſeen in almoſt all the Counties in ENGLAND, for I have viſited moſt of them to encreaſe theſe Obſervations, one where or other in the Fields theſe old Delves, Pits or Hollows, they are now overgrown with Graſs; but in thoſe Counties where Marle is commonly uſed, they are always known to be old Marle Pits; and in others they have generally ſome Report of their having been dug for ſomething to manure the Land.

This Practice, which has been ſo univerſal, I would fain have univerſal again: for no Manure whatſoever is ſo advantageous. Let the Farmer mind well the Nature of his Marle, and the Nature of his Soil, to ſee they are ſuited to one another; and if his firſt Trial do not ſucceed, let him not be diſhearten'd at that, but go on: he will not fail of Succeſs at laſt.

They uſe Marles in many Parts of BUCKINGHAMSHIRE as frequently as Dung in others; and yet in ſome Parts of the ſame County the Farmers ſeem not to know there is any ſuch Subſtance in being. I was the Occaſion of a Farmer's

mer's trying a red Marle, found there very near the Surface of the Earth in digging a Ditch for a Fence. It was one of the pure Kinds, and as ſoft as Fullers Earth in the Hands: and it crumbled in the ſame Manner in Water, and crackled on being put in the Fire. I ſhewed him by theſe and other Marks, that it was a right Marle; but whether he laid it on a wrong Soil, or in whatever unſkilful Manner he manag'd it, when I next ſaw him, he reproach'd me for adviſing him to uſe it, and declar'd he would never try any Projects again. So difficult is it often to get theſe People to make any Attempt; ſo next to impoſſible to make them perſevere.

CHAP. III.

Of the ſeveral Kinds of impure or mixed Marles.

THOSE already named are the richeſt and fineſt of the Marles: and as all Mixture debaſes their Value, among the other Kinds which I ſhall diſtinguiſh by the Name of impure or mix'd Marles, the moſt impure are conſtantly of the leaſt Value. Theſe mix'd Marles differ not only in Colour, but in their very Nature, according to the Subſtances which have got in among them. Their Colour is no general Mark of Diſtinction, but they may be very well arranged under ſeparate Heads, according to the Subſtances of which they partake. Theſe being Sand, Clay, Loam or Stone, they may be conſider'd as

Sandy Marles, Loamy Marles, and
Clayey Marles, Stony Marles:

And among theſe laſt are alſo to be comprehended ſome which have at firſt the Hardneſs of a Stone from their own Nature and Compoſition, tho' they have not a Particle or real Stone in them.

Many Marles alſo, beſide theſe natural Earths and ſtony Matter, contain great Quantities of Sea Shells, which are preſerved in them in a ſingular Manner; for inſtead of being petrify'd, or render'd hard, they are made brittle, and ſeem as if they had been calcin'd. Theſe Shells are far from injuring the Marle in its improving Quality; they, on the contrary, are found to encreaſe that Virtue.

There are of theſe ſeveral Kinds of Marles of all the beforemention'd Colours, but greyiſh or yellowiſh are the moſt frequent. The ſandy Kinds are the richeſt of theſe impure ones; and they are fitteſt for ready Uſe, for they break to Pieces in the Hands eaſier than any others; and the ſooneſt of any crumble with the Weather. In a proper Application theſe may be accounted of equal Value with any, for on clayey Lands the very Sand which is contain'd in them is uſeful.

The loamy Marles are the next in Value among theſe to the ſandy, for they break eaſily with the Weather; but in theſe as the former, a great deal of the Advantage ariſing from the Uſe of them will depend upon a proper Knowledge of their Nature, and their Uſe on a right Soil.

The clayey and ſtoney are inferior to the others; but on ſome Lands the former are preferable to thoſe which are more pure: and amongſt the ſtoney Kinds there are ſome, and they even of the hardeſt, which when properly mellow'd by the Weather, are inferior to none in Richneſs. I have ſeen ſome of theſe that a large Hammer would make no Impreſſion upon when firſt dug up, but that with Froſt, Rain and Sun-ſhine, have in ſix Months Time crumbled away to Powder.

Some of theſe I have ſeen which when broke with great Labour, and laid upon the Lands, have for ſeveral Months appear'd like ſo many Stones ſcatter'd over the Fields, and ſeem'd to damage rather than improve them: but after one Winter there has not been a Piece of any one of the Lumps ſo big as a Nutmeg to be found; and the Land has been kept in Heart eight or ten Years by that ſingle Dreſſing.

One Farmer I knew in Warwickshire, (where they know the Nature and Uſe of Marles better than in any County in England, after Kent and Sussex) who having a ſtoney Marle upon his Ground, dug it at a good Expence, while all his Neighbours laugh'd at him; and after it had been expos'd to the Air and Rain in his Yard till it began to crack and break, laid it on his Corn Lands, and had it broke there with Hammers: after this it ſoon melted and enriched the Land to a Degree beyond Belief.

I name this Practice that the Farmer who has a Marle ever ſo hard and ſtoney, need not for that Reaſon give it up as uſeleſs.

They have in many Parts of Northamptonshire a ſtoney Loam which the common People call Penny Earth, it is full of Sea Shells, ſome of which are flat, and reſemble Pieces of Money, whence it has its Name. This is as hard as Rock when firſt dug, but it moulders of itſelf with the Weather, and even the Shells that are in it diſſolve, ſo that not one of them is to be found on the Lands where it was laid. They uſe it in ſome Places, but not nearly ſo much as it deſerves; when it is kept dry, it retains its Hardneſs for ever.

Marle in ſome Places is to be dug for at a conſiderable Depth, and even this is well worth while: but more frequently it lies near the Surface; ſometimes ſo near, that they plow up a part of it with the Soil; and the ſame Thing turns and manures it, and that very profitably.

In Kent, the Marle ſometimes lies deep; but in Sussex it moſt frequently is within a Foot or two of the Surface, with a tough Clay over it; this anſwers a very convenient Purpoſe, for it holds the Marle ſo well together above, that by undermining it they can have a fall of a hundred Loads or more at a Time, ſo that the Expence is hardly any Thing.

CHAP. IV.

Of certain Marles found in particular Counties.

IN Buckinghamshire I have obſerv'd a very rich Marle of the purer Kind, and of a mixt Nature between the blue and red; the red making

king the Body of the Maſs, and the blue being diſpoſed in Streaks and Veins. This is one of the fatteſt Kinds, as the Farmer terms it; and is the ſame that is ſo much eſteem'd in Kent for ſandy Land.

In Warwickshire they have a blue and red Marle of a ſtiffer Kind, which does not do well on Paſture Lands, but excellently on ſandy Corn Grounds.

In Cheshire they have a Marle of the ſtony Kind, which they call Slate Marle: they give it this Name becauſe it ſplits in the Manner of Slates into flat thin Pieces; they have this of all the common Colours, and it is much the ſame whether red, yellow, whitiſh, or blue.

They have alſo in Staffordshire on the Borders of Cheshire, a Kind of ſtony Marle which always breaks in a Kind of ſquare Pieces; this they call for that Reaſon Dice Marle. It is uſually yellowiſh, rarely rediſh or blueiſh. Both theſe Kinds, tho' ſtony at firſt, mellow, ſoften, and fall to Pieces with the Sun and Rains; and they are greatly eſteem'd by the Farmers. They have in the ſame Places clayey Marles, but they find thoſe clog the Land after their enriching Effect is over; whereas theſe leave it better than it was before they were employ'd, even after their enriching Virtue is gone.

Indeed in moſt Countries they value the ſtony Marles, becauſe of their laſting Efficacy. The fatty and crumbly Kinds enrich the Ground more quickly; but it is theſe hard ones that give that Fruitfulneſs which laſts many Years; after it has ſerved the Purpoſes of the Tenant enriching the Landlord.

One Thing farther I muſt aſſert from Experience, which is, That ſome of theſe Marles of the harder Kinds, which enrich Land for ſo long a Continuance, have often a bad Effect in the End. After this long Period of Fruitfulneſs obtain'd from them is over, the Land becomes ſo barren that ſcarce any Thing can make it fruitful again.

The hard white Marle is moſt ſubject to this Cenſure, for it approaches to the Nature of Chalk, and the ſame Thing has been obſerved of Chalk to a Proverb. But I don't know that the other hard Marles are liable to this Fault.

To the ſeveral particular Kind of Marle mention'd for their Uſe in particular Places, I ſhall add three or four with the Names by which they are known, upon the Spots where they are found and uſed; and then cloſe this Chapter: in which having, I hope, thoroughly acquainted the Huſbandman what Marle is, and how numerous Kinds there are of it, I ſhall in the next proceed to the moſt advantageous Methods of uſing it.

In Shropshire, and that part of Cheshire which borders on it, they have duſky browniſh blue Marle, ſtreaked and ſpotted with a cleaner blue and with white: this they call Cowſhut Marle, and the Country has received great Advantages from the Time in which it has been introduced into frequent Uſe. This is to be refer'd to the blue Marles of the purer Kinds.

In Staffordshire there is a peculiar Kind of ſtony Marle, which they call Shale Marle there as well as in Cheshire, where it is alſo found in Abundance. This is of a greyiſh or aſh Colour, and ſeems a mere Sand Stone: but it breaks freely enough. They do not uſe this ſo generally as they might, but where they do, it turns to a very good Account. If the Farmer therefore finds a blueiſh grey Sand Stone in his Grounds, let him try whether it does not moulder in the Air, or crackle in the Fire, and if ſo, let him ſee to make a better Uſe of it than they do in many Places in this County, where they abſolutely throw it away.

In Cheshire they dig a Marle of a duſky Colour, and tough Subſtance, very unlike the Generality of the other Kinds; this they call Peat Marle. It is one of thoſe which are debas'd by an Admixture of Clay: it is not peculiar to Cheshire, for they have it in Shropshire alſo; but the Uſe differs. In Cheshire they uſe it as a Manure; and if laid on proper Land, as the ſharp ſandy Soils, it yields a good Encreaſe: in Shropshire they make Bricks of it.

They have in Chesrire alſo, and in Staffordshire, and ſome other of the neighbouring Counties, a ſtiffer Kind than the laſt deſcribed. It is of a yellowiſh Colour, and from that and its Toughneſs they call it Clay Marle. This often lies in very deep Beds, but the Farmers are not ſo well acquainted with it as they might be; it is full of Sand and Pebbles in the upper Part of the Bed, where it often riſes within a Foot of the Surface, but it is pure below. This is one of the clayey Kinds, and they uſe it on the worſt Lands with very good Succeſs. Let the young Huſbandman therefore, who thinks his Land is clayey at the Bottom, in ſome particular Spots only, examine this Clay. They ſay all is not Gold that ſhines. 'Tis true Things are often worſe than they ſeem; but ſometimes they are better.

They have alſo in that County a Kind of Marle they call Paper Marle: this lies in Leaves, and is a very pure and rich Kind.

Cheshire is alſo remarked for another Kind of Marle, by ſome ſuppos'd to be particular to that County, they call it Steel Marle: but thoſe who will be at the Pains of examining the ſeveral Parts of the Kingdom with the ſtrict Eye that I have, will find very few Things are peculiar to the Places where they are firſt found, though thought to be produced in no other.

This Steel Marle is of a duſky Colour, often ſpotted with red, and ſometimes with blue. It is very hard; and when ſtruck with a Hammer, naturally ſhatters into a Kind of ſquare Bits. It is one of the ſtony Kinds, and is the ſame in its Nature and Subſtance with that which they call Dice Marle in Northamptonshire, though it differs a little in Colour.

I have obſerv'd with Pleaſure, the Manner in which this Kind of Marle divides when laid upon the Ground. Firſt, the large Lumps lie like ſo much Lumber of which the Land ſhould be cleared: after this one ſees all the Surface of the Field ſpread over with corner'd Pieces of ſome conſiderable Bigneſs: then after a little more Effect of the Weather, it lies every where in Bits like Dice, many of them very ſmall; and after this it is blended with the

Mould, and altogether loſt. Then it is that its full Virtue and Efficacy are ſeen in the Crop.

CHAP. V.

Of ſeeking for Marle.

AS the conſiderate Huſbandman muſt ſee by what has been ſaid occaſionally already, and will ſee more fully by the ſucceeding Chapters, the vaſt Value of Marle: It is natural that he ſhould bethink himſelf of ſeeking for it on his own Grounds, I ſhall not only encourage, but aſſiſt him in the Search.

In the firſt Place he has this to tempt him to examine his Land in Hope of it, that I have obſerved already it is frequent in many Places where it is not regarded or even known: and I ſhall add, that although ſo little obſerved, it is a Commodity ſo naturally and generally the Produce of ENGLAND, that I believe there are few Pieces of Land of any Extent in which one Kind or other of it may not be found.

If it be too deep indeed, it may not be worth taking up, but that is ſeldom the Caſe: it is commonly near the Surface.

The ſeveral Kinds and Varieties of it have been ſo fully deſcribed, that the Farmer has all the Reaſon in the World to ſuppoſe he ſhall know it at Sight: I ſhall add to theſe the Soils under which it uſually lies.

But prior to this, which beginning without any certain Information, is a more random Kind of Search, I would have him examine well both by Report and by the Appearance of the Ground, whether Marle has ever heretofore been dug in his Land, or any where near its Borders.

If he hear that it has, let him look narrowly after thoſe broad and ſhallow Delves in the Ground which have been before mention'd, for they are certainly the Places where the Pits were. If he can learn no ſuch Thing by Report, yet let him ſee if there be any ſuch Hollows in the Ground, for tho' leſs certain, ſtill they are an Evidence that ſomething has been dug. It may have been Gravel, but Marle is more likely.

When he has found any ſuch Hollows, let him mind the Courſe wherein they run, for that Way probably the Vein of Marle runs alſo.

If he find only one ſuch, let him firſt obſerve how deep it is; for on this depends the Nature of his Search, ſince by this he may gueſs whether the Marle lay low or near the Surface.

His Buſineſs is to try all about the Place where the Hollow is, for Marle. If that Hollow be very ſhallow, let him have Holes dug to the Depth of three Foot with a Spade; if deeper, let him uſe an Augar, ſuch as they bore the Ground with on various Occaſions. Let him bore in a great many Places to the Depth of ſix Foot; for if the Marle lie deeper than that, 'tis hardly worth his digging; but let him examine ſtrictly every Thing the Augur brings up within this Depth. Let him keep in his Mind the various Kinds of Marles I have deſcrib'd; and if any Thing come up that has the leaſt Appearance or Reſemblance of any of thoſe ſeveral Kinds, let him try it by ſeeing if it moulders away in a Baſon of Water, if it crackles on being put into the Fire; and what Effect the Sun and Air take upon it when it has lain two or three Nights expos'd.

By theſe Means if there ever have been Marle dug there; and the Vein of it continues, he will be ſure to find where it runs; and he is then to follow the Courſe of it by the Augur, and conſider where he can open a Pit of it the moſt conveniently for the general Uſe of his Land.

But ſuppoſe there be not the leaſt Sign upon the Ground, or the leaſt Account from Report that Marle ever was dug any where thereabouts. Yet this ſhould not diſcourage him from enquiring if there be any; for there is a Time for the Diſcovery of every Thing.

In this Caſe he muſt firſt have Recourſe to what he can ſee upon digging any where. If a Well be ſunk at any Time upon or near his Land, let him look carefully over all the Kinds of Earth that are thrown up. Nay, if a Pond be dug, let him make the ſame Obſervations.

Let him examine the Sides of Ditches new dug or cleaned; and follow the Plow with a careful Eye, obſerving if it any where turn up Matter different from the Soil. For Marle often is within the Reach of the Plow.

If he diſcover nothing of the Nature of Marle in all theſe Reſearches, let him have Recourſe to the Augur, boring in different Places, but chiefly in the clayey Soils, for under theſe the Marle oftneſt lies.

The mellow Earth is the next Soil that is likely to conceal Marle: and after this the loamy Earth. It ſometimes lies under Gravel, but ſeldom in any great Plenty: it very rarely is found under a ſandy Soil, and then commonly in a thin Vein, and at a great Depth.

The clayey Soil not only oftneſt has Marle under it; but that which lies under this Soil is uſually of the fineſt Kind. I have obſerv'd before, that the KENTISH Marles generally are cover'd with a Foot or two of tough Clay. In general it is the fineſt, pureſt, and richeſt Marles the Farmer is to expect under this Soil.

It has been obſerv'd, the fine black mellow Earth of the low Lands, commonly has under it a Bed of tough Clay. Sometimes it has a thick Bed of ſome fine Marle, particularly of the rediſh Kind, in the Place of the Clay; and very often a Vein of Marle comes between the Clay and the Mould.

The former is the beſt for the Farmer; but if the latter preſents itſelf, let him follow with his Augur the Courſe of the Vein, and he will find it gradually thicken till at laſt it uſually takes the Place of the Clay. It is here he is to open his Marle Pit; and he will often fall upon a Bed of Marle five, ſix, or ſeven Foot thick, riſing within a Foot and half of the Surface of the Ground.

Sometimes the ſtony Marles are found under Clay or black Mould, but it is more commonly the pure, fatty, and tender Sort: as to thoſe found under ſandy Soils, they are uſually one

or other of the clayey Marles, and with double Expence in digging, are not of half the Value.

There are ſome Parts of SUSSEX where a Bed of Marle comes up within eight Inches of the Surface, and when open'd is found to be ten or twelve Foot thick, all of ſome one of the pure and fine Kinds: and in CHESHIRE, and alſo in LANCASHIRE, where the beſt Marles often lie under the fine black Mould, I have ſeen a Bed of blue Marle that was within a Yard of the Turf, cut down to four Yards deep, and they were not then got through the Vein.

When the Farmer has by the Methods already deſcrib'd, found out a Vein of Marle, and fix'd upon a convenient Part of his Land for opening of a Pit: let him begin by marking out a tolerable large Place for the Work; and for a proper Way for the Carts that are to fetch out the Marle. A great deal depends upon all this being well order'd, and now is his Time for Contrivance.

He is then to employ his Labourers to clear away with Pick-axe, Spade, and Wheel-barrow, all the Soil that covers the Vein of Marle, and when this is done, they are to begin digging it.

The different Condition of the Marle will now be found, and the neceſſary Accidents of treating it. Where it is of the fineſt and tendereſt Kinds, they often work with a Kind of Hoe, and three Hoers will tear up as much as four can fill it into the Carts.

In the clayey Kinds they uſe Spades for digging, and then the Diggers muſt be more than the Fillers. Sometimes theſe are ſo dry and tough, that the Workmen muſt have Water brought to them to wet their Spades; and in other Places they are ſo wet, that there muſt be a Pump ſet up to keep them dry.

When the Marle is got into the Cart, it is to be ſhot on the Fields, but this in a different Manner according to its Nature. If it be of the fine ſoft tender Kinds; the beſt Way is to ſpread it as it is taken out of the Cart: but if it be of the ſtony or other compact Kinds, every Load had better be ſhot ſeparately, and left in a Heap for the whole Winter, that the Froſt and Air may mellow and break it.

CHAP. VI.

Of ſuiting the Marle to the Land.

THERE are very few Lands that may not be improv'd by Marle, but ſome require it more than others: there are alſo many Kinds of Marles, as well as many different Sorts of Soils; and the Marles of one Kind are fit for certain Lands, and thoſe of other Kinds for others. A ſtrict regard muſt be had to this, otherwiſe, as already obſerved, the Land may be ſpoiled.

In ſome Places they have a Way of laying on ſuch a Quantity of the Marle, that they may be ſaid to add a Soil rather than to improve what was there before. This is the Practice in ſome Parts of CHESHIRE, where they will lay fifteen, ſixteen, or eighteen Hundred Load of Marle upon one of their Acres; they will thus in Digging and Carriage beſtow twelve or fifteen Pounds upon marling an Acre; and then they will work it with good Management twenty or thirty Years together.

For the firſt Years they plow very ſhallow; they don't cut up more than an Inch of the Soil for fear of burying the Marle; ſo going deeper in the following Years. This is a particular Practice.

In the firſt Place, the Soil which requires Marle moſt of all, and which is the moſt improv'd by it, is the ſandy. The Advantage ariſing from this Practice upon ſuch Lands, is beyond the Belief of any who have not ſeen the Fact.

The Marle which is fit for this Land is the clayey Kind, and more than all others that browniſh or yellowiſh Marle, which looks like real Clay in the Pit, but is found of ſo different a Nature when examin'd. This Marle, or any one of the clayey Kind, laid thick upon a ſandy Soil, gives it at once a Body and a Richneſs. The Clay that is in it binding the light Soil tolerably together, at the ſame Time that the fatty and enriching Earth blends itſelf with the whole.

This is the Application of Marle, in which its Virtue is moſt fully ſeen: for by this Means Land, that before wou'd yield ſcarce any thing, has been known to produce ſurprizing Crops; nay, it has been try'd by way of Experiment, to marle one half of a Piece of new broke-up Ground of this ſandy Kind, and leave the other in its natural Condition; then both being ſown with the ſame Seed, the marled Part has yielded a plentiful Crop, when the other has not ripen'd one Ear.

Another great Advantage of this Practice is, that in Years wherein other Crops fail, thoſe ſucceed which are on theſe Grounds even to Admiration. Thus when there comes a dropping Summer, while a Piece of marled ſandy Soil is in its full Vigour, the Encreaſe is prodigious. Theſe Seaſons generally hurt the Crop on other Lands; but they load theſe with as much as can ſtand upon the Ground.

But all this Time Care muſt be taken that the Marle be well ſuited to the Soil; and this is to be done by this Rule; the more ſandy the Ground is, the more clayey the Marle muſt be.

If a raſh young Huſbandman hearing of the great Profit that ariſes from laying Marle on ſandy Soils, ſhou'd without any farther Thought lay on one of the pure fat and tender Marles before deſcribed upon a very barren ſandy Piece of Ground, tho' he put on a CHESHIRE Loading, yet the Wet would waſh it in, and the Sand wou'd ſwallow it up in ſuch a Manner, that the whole Effect wou'd be loſt after all the Labour and Expence.

Next after the ſandy, the Soil which receives moſt Advantage from Marle is the Loamy; and this admits the greateſt Improvement of all when the Sand in its Compoſition bears an over Proportion to the Clay. I have ſeen Lands, the Soil of which was fitter to make Bricks than to yield Corn, ſo improved by Marle, that the Corn has ſtood like a Sward of Graſs at its firſt Appearance; and has throve ſo afterwards, that every Stalk has come to a due Maturity.

The Marle for this Kind of Land muſt be the pureſt and fineſt than can be had. If the Farmer ſhould lay on a clayey, or a ſandy Marle, he would only encreaſe the Proportion of one or other Ingredient of the natural Land which already made it barren.

All that renders a loamy Earth at all fruitful in its natural State, is the Quantity of Mould that is mix'd in it; now a fine Marle is of the Nature of that Mould, only much richer: it blends among the Loam, and the Firmneſs of the loamy Soil holds it till it have yielded all its Virtue.

I have found from Experience, that of all the Kinds of Marle, that which agrees beſt with a loamy Soil, is the blue, pure and tender Marle. After this the beſt is the yellow: but any Marle that is light and free from Mixture will anſwer the Purpoſe.

I have ſeen the ſtony Marles try'd in ſome Counties upon their loamy Soils with tolerable good Succeſs. Particularly in Staffordshire, I have ſeen that Sort they call ſhale Marle, which has been deſcrib'd in its Place, laid on a tough loamy Soil, abounding naturally too much with Clay.

This has ſucceeded but poorly at firſt. The firſt Year ſcarce at all, the ſecond ſomewhat better, and the third and fourth beſt of all. But as I have had Opportunities of making the Computation fairly in both Kinds, I find the pure Marle is very much preferable for this Soil to the ſtony. The Farmer may do well to uſe any of the ſtony Kinds when he cannot get the other Sort in the Neighbourhood, and he will reap conſiderable Advantage from it; but when he can have his Choice, the pure Marle is preferable for this Land by many Degrees.

I have alſo ſeen ſome of theſe ſtony Marles, not of the hardeſt Kind, us'd on ſandy Soils, but without any great Succeſs. I once indeed ſaw a ſtony Marle that had lain a Seaſon expos'd to the Air ſpread upon a Field, the Soil of which though ſandy, had ſome natural Richneſs, and it ſucceeded tolerably; but ſuch particular Practices are not to be eſtabliſh'd into Rules.

The Practice of marling Lands is founded upon Reaſon; and that, as well as Experience, will ſhew in what Manner it ſhould be done. The pure Marles are all fatty; the mix'd Kinds are either clayey, ſandy, loamy, or ſtony; now upon conſidering this the Application is eaſy.

Let us ſuppoſe a conſiderate Farmer to have Pits of all theſe Kinds of Marle upon his own Ground; and to have a ſandy Soil as firſt mention'd to improve: he will naturally aſk himſelf which of all theſe ſhall I uſe? If I lay on pure Marle, the Rain will waſh it to Pieces, and the Sand will ſuck it up and remain as barren as ever. I may lay that pure Marle upon Soils in which there is ſomething to hold it, but never upon Sand: well then, all the pure Kinds are unfit. Now the Choice is among the others: Shall I lay on a ſandy Marle? No: for the Sand will mix with the Sand, and the Marle will be waſh'd away as before. I ſhall only add Sand to Sand with all my Labour? Shall I lay on ſtony Marle? No: Stone and Sand are but a poor Mixture, and when it breaks, it will waſh away as the other. Shall I uſe a loamy Marle? why, the Clay that is in Loam will do ſome good, becauſe it will hold the Fatneſs; but then the Sand in it is again adding Sand to Sand: well then, there remains the clayey Marle, and this is fitteſt of all, becauſe the Clay will bind the Sand, while the fat marly Part enriches it: I ſhall alter my Sand into a Loam, at the ſame Time that I enrich it by the Marle.

Thus Reaſon would adviſe in the Choice of Marles, and Experience ſhews, that it is exactly the Practice which is the moſt profitable.

After ſandy and loamy Soils, that which receives moſt Advantage from Marle is mellow Earth: this wants Improvement leſs than any other Kind, but the proper Uſe of Marle adds to its Fertility; and there is this farther Advantage, that ſcarce any Kind of Marle whatſoever but may be us'd to it: but ſtill there are ſome from which it has more Benefit than others.

Plowed Land, Meadow, and Paſture, when they have this mellow Earth for their Soil, equally receive good from Marle. As to the Graſs Lands, only the pure Marles ſhould be uſed to them, becauſe they waſh in readily, and don't lie about in Clots or Lumps upon the Ground. For plow'd Lands of this Soil, any of all the Kinds of Marle may be uſed with Benefit. If they be of the clayey Sort, they break in with plowing after a little Time; if loamy, they blend ſo much the ſooner; if they be of the ſtony Kind, it takes Time for the Weather to divide them, but they do very well at laſt; and finally, if they be of the pure or of the ſandy Kind, they break with the firſt Dreſſing, and waſh in with the Rains immediately.

All the Farmer has to regard in this Caſe is, whether his mellow Soil approach in any Degree to the Nature of any of the others, for there are in Nature a Variety of Degrees; and then he is to ſuit his Marle according to the particular Directions given in this Chapter, to the Nature of the Soil whereof it moſt partakes.

As to chalkey Soils, Marle is not the Manure moſt ſuited to them of all others, becauſe Marle is itſelf in ſome Degree of a chalkey Nature: nevertheleſs it is to be uſed with Prudence to good Purpoſe.

I have known Farmers who never would permit a Scrap of Marle to be laid on their chalkey Grounds, though they uſed it to the others, and ſaw the Benefit. They called this laying Chalk upon Chalk, and laughed thoſe to ſcorn who adviſed them to uſe it: but I ſhall mention what I have ſeen againſt all the Arguments in the World.

Indeed the brittle white Marle of ſome Counties is in its own Nature ſo like Chalk, that I would by no Means adviſe uſing it on chalkey Lands, tho' on others it may ſerve as a Manure in the Manner of Chalk, which is known to be an excellent one itſelf. The Difference between Chalk uſed as a Manure, and this chalkey Marle, for it may well be called ſo, is, that the Effect of the Marle is more ſpeedy than that of the Chalk; and that it does not wear out the Land ſo very much as Chalk does, which in the End leaves it more barren than at firſt.

Now, though for the Reaſons already given, I do not think it adviſeable to lay the white Marle on a chalkey Soil, yet I have ſeen the rich and pure red Marle, and in ſome other Places the blue Kind, uſed with great Profit. Nor is this at all contrary to Reaſon, for Chalk is one of the drieſt of Soils, and theſe pure Kinds of Marle are the fatteſt of all Manures. What then can be more proper than they to correct the Dryneſs of the Chalk.

I would therefore adviſe the Farmer who has a chalkey Soil, not to be afraid of marling it; only as in other Caſes let him ſuit the Marle to it. The blue and red pure Marles are beſt: after theſe the pure yellow Marle, or the black if that can be had. And in caſe of a Defect of all theſe, he may uſe the loamy, or the clayey Marles, but theſe are fitter as they are richer of the Marle.

Gravelly Soils have the ſame Advantage from Marle as the ſandy, and one Reaſon of this is, that they always have Sand among the Gravel. Theſe let all other Manures be waſh'd through them by the firſt Rains, but the Marles of a proper Kind remain in them. They not only enrich thoſe Lands by their own Mellowneſs, but they give them a Firmneſs that will make them hold other Dreſſings. Dung laid on a looſe gravelly Soil is loſt and ſwallow'd up without any Benefit, but Dung upon ſuch a Land that has firſt been dreſſed with Marle, takes the ſame Effect as upon other Soils.

In this, as in all the other Inſtances, Care muſt be taken to ſuit the Marle to the Soil; if a pure Marle were uſed, it would be waſhed through quicker than Dung; and if a ſandy Marle were choſen, the marley Part of that Mixture would be waſh'd down through the Soil, and only the Sand that was among it would remain. This could be no Improvement to a Soil already too ſandy.

The proper Marle for a gravelly Soil is the clayey Sort. This is the only Kind that is proper; and this never fails of giving the greateſt Advantage.

Laſt of all I come to ſpeak of the clayey Soils, which are in general ſuppoſed to be improper for marling to a Proverb. Every common Farmer can repeat what is retailed from one to another through all the common Writers on Huſbandry, and can tell his Son,

He that marles Clay,
Throws all away.

And this he thinks he has two ſubſtantial Reaſons for believing to be true, becauſe it is Verſe; and becauſe it is in print. But let not the reaſonable Huſbandman be frighted out of his Profits by Rhymes. I ſhall inform him that Reaſon is on the contrary Side, and ſhall add from what I have ſeen and known, that Reaſon is ſupported by Experience, in this as in all other Things.

It may be poſſible enough to throw away Coſt and Labour by laying an improper Sort of Marle upon a clayey Ground; and the ſame may be as truly ſaid of any other. But the Buſineſs of the preſent Enquiry is the ſuiting the Marle to the Land; and when that is obſerv'd, the ſame Benefit will follow from the Uſe of it on theſe, as on all other Soils. I have ſaid before, that all Soils are capable of Improvement by Marle, and it is becauſe there are Marles of very different Kinds, ſome of which are ſuited to every Condition of the Soil. He that ſhould lay a clayey Marle upon a clayey Soil, would have but little Advantage, becauſe it would be in a great Meaſure adding Clay to Clay: and perhaps the Farmers who firſt try'd to marle clayey Grounds, had no other than clayey Marles; and thinking all others like them, ſpoke that in general which was only true in particular.

Excepting the clayey Marles, there is no Kind of them but is good on Clay Grounds. In the firſt Place, all the pure Marles being well worked in by the Plow, blend with the Soil, and looſen and enrich it. The ſtony Kinds are kept on or near the Surface till they mellow and break, and the Firmneſs of the Ground takes in all their Benefit: the loamy Marles, if there be too much Clay in them, are to be rejected as approaching to the Nature of the clayey Kind, but if otherwiſe, they are excellent, as they approach to the Nature of the ſandy ones. Theſe laſt mention'd are for clayey Soils the beſt of all, for they conſiſt only of a fine fatty Marle and Sand, and they act doubly upon the Clay, at once looſening and enriching it. As ſoon as they are laid on, they break and crumble to Pieces, for the ſandy Marles are the brittleſt of all the Kinds, and thus ſeparated the Sand, gets into the Clay, and makes Way for the Marle, which the Rains waſh thoroughly in, and which is then detain'd among it to exert the full Effect of its Fertility.

He therefore that has a clayey Soil to manure, and can get at a ſandy Marle, has it in his Power to raiſe his Land to many Times its original Value. If a due Quantity be laid on, though not ſuch a Load as the Cheshire People uſe, the Sand in the Mixture converts the Clay into a Loam; and it becomes as it were another Soil, enriched with a mellow and fine Manure.

If the Farmer cannot get at a ſandy Marle, he may uſe any of the other Kinds excepting only the clayey, as has been ſaid before.

CHAP. VII.

Of the Manner of uſing Marle.

HAVING taught the practical Farmer to know Marle when he ſees it, how to ſeek for it on his own Grounds, and in what Manner to ſuit the Kind to the Nature of the Land; it remains to inſtruct him in the Manner of uſing it. For this is no little Article, and in this the Experience of others only can be his Guide, comparing their Succeſs one with another: for I am ſorry to ſay, not only the Practice of a particular County may many Times miſlead him; but what has been written under the Appearance of Advice is too often falſe.

As to the Quantity that he ſhall lay upon his Land, I have ſeen ſo many Errors on both Sides, that the Truth ſeems hard to hit. Some of the Staffordshire Farmers lay on ſo little,

that it ſcarce anſwers any Purpoſe. I have known theſe contented to uſe twenty Loads to an Acre, and then they have complained that what was written of the Profit by Marle was not true. In Cheshire, on the contrary, they bury their Land under ſuch Loads, as has been ſaid already, that they ſeem to ſow their Marle and not their Ground.

The Medium between theſe Practices is the right Method; and he who wou'd reap all thoſe Advantages that have been declar'd of Marle, muſt follow that Courſe. The right Uſe of Marle is not to put it in the Place of the Soil, but to make a Mixture of it with the Soil, ſo as to raiſe a poor Land into the Condition of one naturally rich: to do this, a due Quantity of the Marle muſt be employ'd; and to give a general Rule, that ſhould be about a hundred Loads to an Acre.

The beſt Way of ſowing marled Land is under Furrow, this I have ſeen prov'd by many Experiences.

The Farmer is not to look for the full Effect of this the firſt Year, but it will laſt as before obſerved: and the Continuance will be according to the Nature of the Soil, and the Kind of the Marle, ſeven, ten, twenty, or even thirty Years.

When the Farmer ſees his Land that has been marled after fair Weather look all over white, as if covered with a Hoar Froſt, he may conclude it will anſwer his beſt Expectations. It is a Proof that the Marle was good in itſelf, that it has been uſed in due Quantity, and that it is well mix'd with the Land.

Some have deliver'd this white Appearance as a Mark that there is Marle in any Part of the Land where it is ſeen; but Marle cannot diſcover itſelf in that manner in its natural Beds, unleſs they lie almoſt cloſe to the Surface. It is therefore of little Uſe in that Reſpect, but on the Lands where it has been laid, when there is this Appearance, 'tis certain that it is mix'd and mellow'd in the Ground.

I have ſhewn to what particular Lands the different Sorts of Marle are requir'd. If the hard and ſtony Kinds are uſed, they muſt be laid on early in the Seaſon: if the Clayey a little later, the Loamy may be a little later yet than the Clay: the pure Marles of all Kinds, and the ſandy Marles, are to be laid on very late. In this the Farmer's Diſcretion will direct him after theſe general Rules. The proper timing of the laying on this Dreſſing regards its Effect for the enſuing Year; but the harder Kinds with the beſt Management will not do much ſo ſoon.

The Method already nam'd of piling the ſtony Kinds in Heaps, that they may break before they are laid on the Land, is uſeful. Some ſprinkle the Marle, in theſe Heaps, from Time to Time, to aſſiſt this Breaking: and in ſome Counties they calcine not only theſe harder Marles, but any Kind they have into Lime, in Kilns made for that Purpoſe. They all burn eaſily, but they make a weak Kind of Lime. I have ſeen this try'd with great Advantage on ſome very indifferent Lands: the Quantity to be uſed of the burnt Marle is about fifty Load to an Acre.

This burning of Marles, tho' it ſucceed well enough, is altogether altering their Quality. It is fitteſt for the harder Kinds, but I ſhould prefer the Uſe of the Natural Marle, from what I have ſeen, far before it.

The laſt Method of laying on the Marle is, to ſhoot the ſeveral Loads as they are brought out of the Pit, at about equal Diſtances one from another; and then to ſpread them all. This will occaſion the Ground to be all cover'd with the ſame Thickneſs. When it is thus ſpread, it muſt be well mix'd with the Soil, and all laid ſmooth and level together: and the quicker this is done from the Time that the Marle be taken out of the Bed, provided it be a pure or a ſandy Marle, the better; for as theſe crumble to Pieces almoſt directly, the Buſineſs is to get them mix'd in the Ground at once, that they may begin to break among it, and ſo perfectly make one Body of the whole; for this is the true Nature of an Improvement by Marle.

A clayey Marle ſhould never be laid on in the Beginning of Winter, for it ſometimes, inſtead of breaking, grows tough with repeated wetting, and the Land that ſhould have been improved, is render'd worſe by it.

This is one of thoſe Accidents that have made the Farmers in ſome Places declare againſt Marle when they had try'd it. Accidents are poſſible to all Things, they uſually happen thro' Ignorance; but ſometimes the Seaſons occaſion them, the prudent Farmer is to inform himſelf how they may be cured.

In caſe of the Marles binding in this Manner, he muſt ſtrew over it a ſmall Quantity of Marle Lime, or of other Lime mix'd with well rotted Dung; this will immediately break it: and not only that, but the Land will be ſo much the more enriched by this double Dreſſing, that the Largeneſs of the Crop will leave him no Room to complain of his double Expence: it will be doubled in Proportion. This I have ſeen try'd, and I have been ſurpriz'd at the Produce. Thus Accidents when rightly manag'd may prove Advantages.

If the Field to be marled lie level, the Marle is to be ſpread evenly over it, not thicker in one Place than another: but if it lie upon the Deſcent, the beſt Way is to ſpread the Marle half as thick again on the higher Part of the Field as on the lower, for the Rains will waſh enough of its beſt Part down to make all equal. I have ſeen where a Field has lain greatly on the Deſcent, and this Management has not been uſed, the Crop vaſtly thicker on the lower Part than on the upper; and on examining the Soil, it has appeared quite different in the upper and lower Part; not only a great deal of the Richneſs of the Marle, but of the fineſt Part of the Soil itſelf being waſh'd down.

Theſe are Accidents on which the prudent Farmer ſhould always have a watchful Eye; for he may prevent their Inconveniencies by right Management.

Burnt Marle, or as it is rightly enough called Marle Lime, can never be needful where pure Marle has been uſed, although it may after the tough clayey or other mixed Kinds; for inſtead of binding, the pure Kinds moulder away

away either while they are wet, or in the drying.

The Nature of the Soil is to be conſider'd for the Time of laying on the Marle, as well as the Nature of the Marle itſelf. If it be a hard binding Ground, the beſt Time of laying on the Marle is the Beginning of Winter; if a light looſe Soil, the Spring or Summer: always accommodating this however to the other Conſideration, the Nature of the Marle itſelf, as that is the moſt important.

If the Farmer upon thoroughly conſidering the Nature of his Land, determine after eight or ten Crops upon the Strength of his Marle, to have Graſs, he muſt manage according to the Nature of the Marle that he uſed.

If it were a ſtony or a ſandy Marle, or if it were any of the purer Kinds, he has nothing to do but expect the Graſs when he lays the Land for it, for without any farther Aſſiſtance it will come with great Strength and Freſhneſs: but if it were a clayey Marle that he uſed, ſo much of its binding Quality will remain after the Richneſs has been drawn away by theſe ſucceſſive Crops, that unleſs ſomething be done to help it, there will be but a very poor Appearance of Graſs. Foreſeeing this, he is to uſe the proper Remedy; that is, he muſt give it a Dreſſing of Dung and Lime toward the End of the Time. By this Means it will yield him two or three Crops more, and excellent Graſs afterwards.

It is impoſſible to give one and the ſame Direction for all Lands, as to the Times of marling, and what may be reaſonably expected from them; for the Nature both of the Marle and of the Soil, make an endleſs Variety; but the Farmer will ſee by his Crops when the Land needs to be refreſhed.

CHAP. VIII.

Of the vaſt Fertility of marled Lands.

TO encourage the Farmer as much as poſſible to the Practice of this excellent Part of Huſbandry; I ſhall add ſomething of the Advantages of the Practice, which are ſo great, that I am ſenſible he who has not lived in Counties where it is commonly uſed, will not eaſily believe the Accounts. However, having Truth for my Guide, I ſhall ſpeak freely, and refer the Cauſe to the Determination of experienced Perſons.

In the firſt Place, the Quantity of Corn that will ripen upon a well marled Land, is much greater that than which can have Nouriſhment on any other, for there is nothing whatſoever ſo full of real Nouriſhment for Corn as Marle.

I have ſeen a Piece of Ground ſo exceedingly barren, that the common Heath Ground is not worſe, try'd with Marle to the greateſt Advantage. That Soil which would hardly afford Nouriſhment to wild Graſs or Weeds, being well cover'd with Marle, has yielded a prodigious Crop.

It was in Buckinghamshire I ſaw this Experiment, the moſt fairly try'd by a Gentleman who had diſcover'd a good, fat, but ſomewhat clayey Marle upon his Eſtate: he order'd an Acre of this barren Land, that in the Memory of Man had hardly let for any Thing, to be cover'd with four hundred Load of Marle. The Eyes of all the neighbouring Farmers were upon him, and the firſt Year they began to laugh at him as a Schemer, for it did not yield much; but the three ſucceeding Years, though he did no more to it, the Crop was larger than on any of their beſt Lands.

This is Fact: and is not this a plain Way for a Farmer to make a Fortune. Let him ſee there is Marle to be had; and then let him take a Piece of ſuch Ground in a proper Manner; he will have it for little, and it will yield more than the fineſt Lands in the Country.

He who ſhall attempt to make himſelf in this Manner, need never be afraid of the Expence of Dreſſing the Ground. Let him firſt take Care according to the Rules before laid down, that the Marle he uſes be a proper Kind for the Soil, and it will anſwer at any Price.

The Cheshire Farmers who uſe ſo monſtrous a Quantity of Marle, and often fetch it a great Way into the Bargain, never find themſelves Loſers, except by the Folly of ill-matching the Soil and Kind. When theſe ſuit one another, though they beſtow twenty Pound an Acre upon their Land, as they ſometimes do, laying on the Quantities before mention'd, they always find it worth while.

The great Advantage of Marle, is its laſting Virtue, for according to that is to be counted the Expence; good Dung is worn out in three Years Crops, and muſt be renew'd: but the marling laſts thirty in ſome Places. In this Caſe, though it coſt ten Times as much at firſt, the Price is the ſame in the End: and there is no Proportion between the Crops on dunged Land, and marled.

There are Years when moſt other Lands fail: but it is the Advantage of Marle that it ſtands all Seaſons. Thus when others have poor Crops, he that marles his Land has plenty-full Harveſts. This enriches him doubly, becauſe of the advanced Price of Corn in thoſe Years, and at the ſame Time it is a Benefit to the Country.

In fine, there are many Ways by which the Huſbandman may with Care and Induſtry get himſelf a Fortune, but none ſo ſoon as by this.

To theſe Obſervations of my own, I ſhall add a Letter from a very worthy and experienced Gentleman in Shropshire; containing ſome Things, which as they came ſo well from his Hand, I have not mention'd before.

To *****

SIR,

"Whereas I underſtand you have been making "Enquiries about the Nature and Uſe of Marle "in this Part of England, deſigning to print "your Obſervations, I take the Liberty, tho' a "Stranger to you, to contribute my Mite to "ſo good a Work: and you may depend all I "ſay is true, for I have try'd it. I muſt needs "ſay our Farmers know the Uſe of Marle well "enough on their Corn Lands, but they don't "uſe it on Paſture and Meadow Grounds ſo

"much

" much as they might. I have for many Years " had better Hay, and better Feed for my Cat- " tle than any of my Neighbours: and though " I tell them it is becauſe I marle my Graſs " Grounds, they won't imitate me. But I aſ- " ſure you from Experience, it is very profit- " able. I once damag'd a fine Meadow by lay- " ing on a clayey Marle, and another Time I " buried the Graſs by loading it too much: " but now I have found by frequent Trials, " what is the right Sort and right Proportion, " I never fail. I lay a light crumbly Marle " upon my Graſs Grounds, not minding the " Colour, and I allow twenty Load to an A- " cre; this always pays ten-fold. Another " Thing I muſt needs tell you, which I have " learn'd from Experience. When I deſign to " break up a Piece of Ground, I marle it well " two Years before. I allow for this thirty " Load of good Marle to an Acre; by this " Means my firſt Year is as good as ſome " People's ſecond or third after marling. Then " there is another Thing upon my marled plow'd " Land; I don't begin with Wheat as others " do: I ſow for the firſt Crop Oats, the Land " is in Heart enough to yield them well, and " then the three or four next Crops I have " Wheat or Barley. I always do another Thing " particular, that is, I harrow in the Marle " juſt before I plow it, and thus I mix my " Marle better with the Soil than they ever can " do. I have at one Time or other try'd the " different Grounds in my Poſſeſſion, with dif- " ferent Quantities of Marle; ſome require " more, ſome leſs: but upon a Medium, I " think between a Hundred and a Hundred " and fifty Load to an Acre is the due Propor- " tion. I have one Field that ſwallow'd above " two Hundred Load to the Acre, but I am " ſenſible now that was becauſe I uſed a wrong " Kind. I find by Experience that my flat " Lands do beſt for Marle, for it does not " well lie upon the others, 'tis ſo eaſily diſſolv'd " and waſh'd away by Rains: I always allow a " larger Quantity to thoſe Fields, but they do " not ſucceed ſo well. If theſe Remarks can be " of any Uſe, I ſhall be very glad to have given " any Help to your publick ſpirited Deſign; " who am,

Worthy SIR,

Your humble Servant to command,

William Hunsdon.

CHAP. IX.

Of the Uſe of Mud as a Manure.

HAVING begun this Treatiſe on Manures with Marle, I ſhall proceed to examine ſuch others as are of an earthy Nature, before I enter on thoſe of the ſeveral other Kinds.

In this Courſe the natural Choice for the next in order falls on Mud, for although Mud is in its Origin and Nature different altogether from Marle, yet it more than any other Kind reſembles it in ſome of its Effects.

Mud, properly ſo called, is the fineſt mellow Earth, waſh'd and worn to a ſurprizing Fineneſs by the Action of Water. This is the Condition of fine and pure Mud: of the other Kinds I ſhall ſpeak preſently. This is ſuch as is drag'd out of the Bottoms of Rivers, where it has been many Years collecting, and where Sand and all other Foulneſſes whatſoever are thoroughly waſh'd from it.

No one will wonder that I ſay this, in ſome of its Properties, reſembles Marle. It is the ſofteſt, fatteſt, and melloweſt of all earthy Subſtances after that; and like Marle it breaks with the leaſt Rains, and crumbles away: ſo far they are alike, as alſo in giving great Fertility: but Marle is a particular Subſtance, and has a laſting Quality of enriching Land, whereas Mud is only Mould in a particular Form, and its Effect is of no great Continuance.

The next to the Mud of Rivers is that of Ponds: but this is leſs pure and fine; it is often clayey, and generally has ſome Mixture of Sand.

The laſt Kind to be named is, that Mud which is thrown up in the Cleanſing of Ditches. This is the pooreſt and worſt of all: but even the worſer Sorts are not to be rejected or deſpiſed; for they have their particular Uſes which the very fineſt would not anſwer ſo well.

The Mud of Ditches, eſpecially thoſe by Road Sides, is full of Grit and Sand, blown in with the Duſt: it is ſhort enough, but wants Mellowneſs.

The firſt Thing the Farmer is to do in theſe Matters, is like what he is to do in reſpect of his Marle. He muſt learn to diſtinguiſh theſe three Kinds of Mud by the Names of River Mud, Pond Mud, and Ditch Mud; and then conſider from their Nature and from Experience, what Soils each of them will ſeverally ſuit.

As Marle is moſt uſed on plow'd Lands, Mud is moſt frequently laid on Paſture and Meadow Grounds. But this need not be eſtabliſhed as an univerſal Rule. We have ſeen how Marle may be uſed with Advantage on Paſture Grounds; and Mud will alſo help many Corn Lands.

Marle is commonly uſed alone, and Mud with other Ingredients; but in ſome Inſtances Marle may be mix'd alſo; and in ſeveral Caſes Mud may be beſt uſed alone.

From the different Nature of the Mud it is qualified to anſwer different Purpoſes. River Mud is proper to give Fertility, and nothing elſe: for its Richneſs is all its Character. Pond Mud will enrich, and at the ſame Time give a Body to the Soil from the Clay it uſually contains; and Ditch Mud though it will leſs enrich, will ſerve better than any to break a tough Land.

When Mud is to be laid on a plow'd Land, this is uſually the Kind:

From this Conſideration of their Nature, the Farmer will be led to a general Notion of their Uſe, and the Lands to which they are ſuited. Thus the River Mud is proper for Meadows and Paſtures of a mellow Soil, that want nothing but a Recruit of that fine Mould, which the ſeveral Growths have waſted and drawn forth;

Pond Mud is beſt where the Soil is too light and crumbly; and Ditch Mud is preferable to both on a clayey Ground.

Mud, eſpecially that out of Rivers, has this particular Quality, that it mixes in a favourable Manner with the finer Part of Dung. This I have obſerved ſeveral Times in my own Meadows. When I have given them a Sprinkling of Mud and Dung mix'd together, after a few Showers going over the Ground, I have found the ſtrawy Part waſhed clean, and nothing but that remaining; the Mud and the rich Part of the Dung being wholly gone down into the Land: and the next Crop has ſufficiently found their Effects.

People who ſtudy the Growth of Plants, talk greatly of the Value of virgin Earth, that is, Earth on which nothing ever grew. River Mud is the neareſt this virgin Earth in its Nature, of any thing whatever.

I have ſeen in ſome Parts of Northamptonshire, the fine black Mould which they there call the moory Soil, laid upon dry gravelly Grounds with great Succeſs; the Mud of Rivers would anſwer this Purpoſe better: this I affirm from Experience; for having adviſed an Huſbandman of that County, who uſed to take this black Soil out of the Fen Lands for his ſtony Paſtures, to uſe Mud dragged out of the River Nen, or Nine as they call it, in its Place; he has ſince acknowleged to me, by Letter, that he found he could dreſs his Paſtures this Way at leſs than half the Expence, and they produced better.

I adviſe the Farmer who has dry Paſtures, whether they be of a ſtony, gravelly, or ſandy Nature, to uſe this Manure preferably to all others; but let him obſerve the following Directions:

If the Land be entirely of a looſe Nature, let him uſe the Pond Mud, mix'd with rich well rotted Dung; and lay it on in a good round Quantity.

If the Soil be mellow, and only require to be recruited and put in Heart, after ſeveral Growths that have exhauſted it, let him mix pure River Mud with the Dung of Poultry or Sheep, and ſcatter this lightly over the Ground. A very little of this anſwers the Purpoſe; and it is beſt to uſe a little at a Time, and repeat it often.

If the Soil be clayey, let him take the Mud of Ditches, and make a Mixture of it with Chalk and rotten Dung: this being ſpread tolerably thick, will break and mellow the Ground, as well as give it Warmth and Richneſs.

I know a Farmer in Lincolnshire, where there are as many fine feeding Grounds, as any in moſt Places, who always excelled the whole Neighbourhood in this Reſpect; and it was by means of a Compoſt of his own inventing, of which he gave me the following Account: I place it here, becauſe Mud, of which we treat in this Chapter, was the material Ingredient.

He made choice of a Piece of low Ground near his Yard, where the Drainings of the Yard naturally came; he there dug an Hole eight Foot deep, the Soil was a mellow Earth, and at this Depth it reſted upon Clay; and there was ſome Sand and Gravel, and a thin Bed of light Clay between. He made his Diggers throw up the good Soil on one Side of the Pit, and the Clay, Sand, and Gravel, on the other.

The Pit being thus ſunk, he threw in, firſt of all, ſome Litter, and upon that a Layer of large Hedge Weeds, that were not run to Seed; over theſe he threw in the Soil that had been laid by itſelf; then he threw Cow Dung in a good Quantity. When this was done, they drag'd up the Weeds out of the neareſt Waters, and laid in a great Bed of them, then they cover'd all three or four Foot deep with rich Pond Mud: upon all this they threw in more Earth, from the parings of Banks, and cleaning of Ditches, and then laid over all, more Litter to ſtop the Wet, and let it drain there.

This Matter he let lie a conſiderable Time, all the while rotting together, and receiving the rich Drainings of the Yard. When all was mellowed together he dug it out, and ſpread it lightly upon his Paſture Grounds; and to this was owing that particular Encreaſe.

It is in every Farmer's Power to imitate this Practice. I am a Witneſs that it will excellently anſwer the Intent in Graſs Grounds, and I believe it would do very well upon the mellow Soils in Corn Lands, but this has not been try'd.

CHAP. X.

Of the Uſe of Clay as a Manure.

IT may ſeem ſtrange to the unexperienced, that Clay, which, when it makes the eſſential Part of a Soil, requires more manuring than almoſt any other, ſhould itſelf ſerve as a Manure; but Practice ſhews that it anſwers, in this Caſe, excellently, when uſed with Diſcretion. And indeed, as the Barrenneſs of moſt Soils conſiſts in the Abundance of ſome one Ingredient in the general Mixture; there is ſcarce any one Kind that may not ſerve as a Manure for ſome other.

Nature, when ſhe ſucceeds very happily, often does it no other Way than by a due Mixture of ſeveral unpromiſing Ingredients; or of ſuch Things as might, of themſelves, be called unfruitful. The due Mixture of one with another, is the great Matter.

Thus Sand is of itſelf barren, nor will a little mellow Earth mix'd with it, render it fruitful: in the ſame Manner Clay is in itſelf barren, and tho' ſome Mould be mixed with it, 'tis ſtill hard, tough, and fruitleſs; but when Clay is added to the Sand and Mould of the firſt named Compoſition, or when Sand is added to the Clay and Mould in the ſecond, either Way there is made a loamy Soil, which is ſufficiently fruitful.

We ſee therefore how it is that Nature gives Fertility to theſe unpromiſing Ingredients; and in the ſame Manner we can give it by Art. The firſt Buſineſs is to know what makes the Soil barren; and the next to ſupply its Defect. Thus we can add Sand to a clayey Soil; a Clay to one that is ſandy: and in this Light it is that Clay, which is barren in itſelf, yet under proper Directions, ſerves as a Manure to give Fruitfulneſs.

Clay is, upon this Principle, uſed alone in Staffordshire, and ſome other Counties, as a

Manure to ſandy, and alſo to gravelly and ſtony Lands. For this Purpoſe Clays are taken juſt as they came out of the Pit; and the Difficulty of mixing them well with the Soil, which is in this Caſe the Farmer's greateſt Trouble, is very well repaid by the Fertility they give.

The Principle upon which Clay becomes a Manure in theſe Caſes is very plain. A loamy Soil is preferable to a dry Sand, or a ſcorching naked Gravel; if Nature had mixed ſome Clay with theſe gravelly or ſandy Soils, they would then have been loamy Soils, and would conſequently have been more fruitful. Now what Nature might have done, the Farmer in this Caſe may do, as before ſaid. In adding Clay he converts the ſandy to a loamy Soil.

In this Caſe the Clay acts in a double Capacity; in the firſt Place it gives a Firmneſs to the Soil, enabling it to give a proper Fixture to the Roots of the Corn, and to retain other Manures; and in the ſecond, by its natural Coldneſs, it tempers the ſcorching Heat of the others, which in dry Summers burn up the Crop.

Clay from the Pits is better for this Purpoſe, than ſuch as is taken from the Surface of the Earth; becauſe it is purer, and never having had any Growth upon it, 'tis ſo far of the Nature of a virgin Earth.

The beſt Clay for the Uſe of theſe abſolute ſandy and gravelly Soils is the red, the next beſt the yellow. But when there is a fairer Mixture of Earth with the Sand, then the blue Clays anſwer beſt; for there is ſomewhat of a Fatneſs in them which tends to the Quality of Marles.

I would, by all Means, adviſe the Farmer who has a barren, ſandy, or gravelly Soil to deal with, to uſe the red or the yellow Clay as a Manure. He may have theſe Lands cheap; and once manuring them will laſt for his Life.

There is ſomething which Clay, uſed as a Manure, enjoys in common with Marle, that is, the laſting Fertility it gives: in this Reſpect it even exceeds Marle, for the Effect laſts longer.

I at this Time know ſome Lands that have been dreſs'd with Clay near thirty Years ago, and retain the Fertility yet; and I dare ſay will hold good ten or twelve Years more. There can be no Miſtake in this Matter, becauſe in the Inſtance I name, which is upon the Edge of Buckinghamshire towards Middlesex, it was only one Farmer who uſed a yellow Clay upon his ſandy Field. The Time is well known when this was done; and his Crops at this Day are greatly richer than thoſe upon the other Fields, from which he is parted only by an Hedge; and which had all the ſame natural Soil.

There cannot be a cheaper or readier Manure than Clay, ſo that it is ſtrongly recommended that Way; and we ſee fair Experience ſhews its Value, and the certain and laſting Profit that attends its Uſe.

As to Quantity, I am in this as in all other Reſpects, for uſing Moderation, I know too little of any Manure cannot do any good; and at the ſame Time I am for making up the natural Soil to Fruitfulneſs, not for laying another Soil in the Place of it. I would adviſe the laying on about Seventy-five Load to an Acre; to be encreaſed or diminiſhed according to the particular Circumſtances: and from what I have ſeen I may tell the Farmer who ſhall practiſe this Method, not to be diſheartened, if it ſeem at firſt to want Succeſs.

There requires a thorough mixing of the Clay with the natural Soil, to bring it to any conſiderable Encreaſe of Fertility; and with all the Pains the moſt induſtrious Man can take, this is not to be done at once. A tough Clay, though laid on ever ſo carefully, will remain in Cakes and Lumps, in ſome Degree, for at leaſt a couple of Years.

Upon this depends the Circumſtance of the Improvement not being ſeen at firſt. As the marled Lands do not come to their full Richneſs till the ſecond Year, theſe clay'd Fields are not at the beſt till the third or fourth. But by this Time, with good plowing and harrowing, the Clay gets well mix'd in; and then it is another Soil, and produces accordingly.

I have known the firſt Year's Produce of a clay'd Land, rather leſs than it uſed to be when left to itſelf. But from this Time it has grown better and better, till the fifth, ſixth, or ſeventh Year; and from that Time has held its Degree of Fruitfulneſs, as if it would continue without End.

The Farmer is not to expect ſuch Crops upon one of theſe Lands, as upon a good Soil well marled, where the Rent is many Times higher, and the Manure coſts many Times as much; but computing all Things, the Improvement is at leaſt equal.

Thus far I have conſider'd Clay in its native State for a Manure; but I muſt not quit the Subject before I have taken a proper Notice of it, as it is altered by Art, for the Service of the Farmer.

Though Clay, in the Lump or Cake, has been found to be very barren in all Parts of the World; yet it has been ſeen in many Places, from different Accidents, that Clay, when reduced to Powder, makes very good Mould.

Upon this has been eſtabliſhed the Practice now uſed in many Places, and getting very deſervedly into Uſe in more, of calcining Clay, or burning it, for the Uſes of Huſbandry: the Advantages of which are very great.

It appears plainly, from the Fertility of powder'd Clay, that it is not the Subſtance of that Earth which is an Enemy to the Growth of Plants, but only its compact Texture. Now nothing is able to break that compact Texture of Clay like Fire; and therefore burning has been diſcover'd for this excellent Purpoſe. There are, at this Time, many Kilns built for that Uſe, in different Parts of the Kingdom; in ſome of which many thouſand Loads of red, yellow, and blue Clay are burnt yearly: and it were well for the Country, if the Number were twenty Times as great.

The Fire takes away all the Toughneſs of the Clay, and in this half-burnt Condition it is a moſt excellent Manure for Corn Lands of the looſer and dryer Kind: breaking eaſily, and mixing thoroughly with the Soil in a very little Time.

There is alſo a black Clay called Urry, found in Coal Pits, which is naturally crumbly, and mixes

mixes readily with any Soil, giving it great Fertility; it uſually lies juſt over the Coal.

Let the Huſbandman learn by this, not to deſpiſe any thing as a Manure from its appearing unlikely to give Fertility to the Ground; for at firſt Sight nothing could ſeem more unlikely than Clay: and let him learn not to deſpiſe Projects; for this burning of Clay was at firſt abuſed under that Name.

CHAP. XI.

Of the Uſe of Loam as a Manure.

I HAVE ſhewn in what a profitable Manner Clay is employ'd as a Manure, and in the ſucceeding Chapter ſhall ſhew how Sand is uſed to the ſame Purpoſes; Loam, as has been explained already, is only a Mixture of Clay and Sand: therefore as theſe are ſeverally uſeful to ſuch Lands as want one or the other, this Mixture of them is, in ſome Places, employ'd in the Dreſſing of Lands that want both. I have placed it next after Clay as neareſt of kin to that Earth, and ſhall add what I have ſeen on the Subject of its Uſe as a Manure, for it is only from Experience I ſhall write of it.

The Uſe of Loam, or loamy Earth, as a Manure, is more limitted than that of the others; but it is in the narrow Bounds allowed to it, not trifling.

Clay enriches a ſandy Soil by giving it a Body: Sand improves a clayey Soil, by breaking its Toughneſs; it is alſo uſed with Succeſs on ſome gravelly Grounds, but there are ſome of theſe with which Clay will never mix: for thoſe Loam, or a loamy Earth, is the only Manure.

When a gravelly Soil has a good deal of Sand in it, as is frequent; or when it is full of ragged Flints, or rough Pieces of Stone, it will receive the Clay that ſhall be laid on it as Manure. But when the Soil conſiſts only of ſmooth round Pebbles, and a little Mould, the Clay will never mix among it. Of this I ſaw an Inſtance lately in KENT, which I ſhall ſet down as an Example of the Uſe of Loam.

THOMAS EDMUNDS had a couple of Fields, the Soil of which was made up of round blueiſh ſmall Pebbles, and a little hazel Mould. But to look upon the Fields, any one would ſuppoſe them to be plain naked Gravel, for the Rain continually waſhed in the Mould, and only the Stones were to be ſeen.

He had try'd Dung upon it a Year or two to no Manner of Purpoſe. The Gravel was too hungry for that Manure. A clayey Marle would have done well on this Soil, if laid thick enough, but there was none near; he had been adviſed to lay on Clay, which he try'd only on one Field, having no great Opinion of it. The Clay never mix'd with the Soil at all, but lay looſe after all his Plowings, and did more Harm than Good.

The Clay he had uſed was yellow, and the Neighbour who gave him the Advice thought the Colour was the Reaſon of the Failing. There was a Pit of Brick Earth open hard by, this was a rediſh Loam. He took this for red Clay, and adviſed EDMUNDS to try it on the other Field. So careleſs are theſe People, in their own Concerns, that they don't know one Earth from another.

He laid on the Loam two and twenty Loads to the Acre, and after a couple of Plowings it perfectly well mix'd with the reſt. Not only the Pebbles hung very well in it; but the Mould turn'd up by deep Plowing, mingled with the reſt entirely and perfectly.

This Field had been worked four Years when I ſaw it, and it was then in excellent Heart. The very Nature of the Soil was chang'd: one would not have believ'd, by looking on it, that it ever was the ſame with that of the other Field. He is now at work upon that in the ſame Manner, and I doubt not but he will find the ſame Benefit.

I once in HERTFORDSHIRE ſaw Loam laid on a very dry ſandy Soil. I confeſs this at firſt ſtartled me: becauſe adding Sand to Sand ſeem'd ill Huſbandry, but he was a ſenſible Man that did it, and he gave me a very good Reaſon.

This was a hard ſandy Piece of Ground which would never take Clay: he had try'd many Times to dreſs it with that Manure, but it would never break nor mix. This Loam contain'd a great deal of Clay, with but a moderate Quantity of Sand, and it broke and mix'd freely enough with the Soil. So the Farmer had the Advantage of the Clay which was contain'd in the Loam, and the Addition of Sand to his Land, that was before too ſandy, was not great.

It is thus the Huſbandman muſt ſometimes compromiſe Matters, Benefits cannot always be had entire. The Harm he did his Ground by the Sand that was in this Loam, was much leſs than the Good it receiv'd from the Clay; and therefore, on ſtating the Account, the Ballance was in his Favour.

I have ſeen Loam uſed as a Dreſſing to a ſmall Field of a chalky Soil. This, though not a common Practice, is very reaſonable, and the Benefit was very conſiderable.

Chalky Soils are hot, dry, and looſe; now the very Nature of a clayey Loam is cold, moiſt, and tough. Theſe Qualities in the Loam being the oppoſite ones to the Fault of the Chalk, they muſt needs correct and improve it. Thus that is often founded upon Reaſon which appears the moſt ſtrange.

Loam, or a loamy Earth, may alſo be uſed with Advantage on theſe looſe mellow Soils, which they have in LINCOLNSHIRE, which are ſo looſe and light, that they will not give Hold enough to the Roots of the Corn. Clay would be an Advantage to theſe Lands, but as Clay will not readily mix with them, there being nothing there to break it, a Loam, conſiſting of a large Proportion of Clay to a little Sand, will excellently anſwer this Purpoſe: the Sand diſpoſing the Clay to break and mix with the Mould, which otherwiſe it would not; and the ſmall Quantity of Sand that goes in along with it, being of no bad Conſequence.

I have been the larger on this Head, becauſe Loam, or loamy Earths, are always at hand; and their Uſes in Huſbandry are very imperfectly known. We ſee almoſt any thing will anſwer the Purpoſe of a Manure on ſome Soil or other; and it is good to know all that can be uſed, that when one cannot be had another may.

Loam is one of thoſe Manures that leave Room for the Advantages of any other. Dreſſings of Dung, and all the rich Kinds, come very well upon the Lands after the Loam, which puts them in a Condition to receive, and to detain their beſt Parts; and on this depends a great deal of the Succeſs of Huſbandry.

A great Art is, not to throw the rich Manures away, which is eaſily done upon what are called hungry, and looſe Soils; Loam gives theſe a Body, and after that they will retain whatever is given them.

CHAP. XII.

Of the Uſe of Sand as a Manure.

THE practical Huſbandman will not be ſurpriz'd to hear of Sand, which is in itſelf the moſt barren of all Things, uſed as a Manure, becauſe he has doubtleſs ſeen it ſo employ'd with Succeſs: nor will he who is but beginning to learn that Profeſſion, wonder at ſuch an Account here: becauſe he has been prepared for it by what has been ſaid occaſionally before.

Every Farmer knows that Sand is good to be laid on Clay Grounds: but we ſhall in this Place conſider its Uſes a little farther.

In order to the more perfect underſtanding of the Advantages ariſing from a Uſe of Sand; and to prevent Miſtakes which might obſtruct the natural Good of uſing it on proper Lands, the Farmer muſt recollect what has been ſaid in a former Chapter concerning the three Kinds of Sand.

Theſe are Sea Sand, River Sand, and Pit Sand. Sea and River Sand where they are both ſharp and ſtony, are the ſame Thing originally, being both no other than Pit Sand waſh'd clean; but they differ in this capital Reſpect, that the one is impregnated with Salt, and the other not. There is another Kind of Sea Sand, as before obſerv'd, which is made up only of Shells broken to Pieces: and ſome ſhelly Matter is frequent in moſt Sea Sand.

For the Purpoſes of Huſbandry therefore, following this natural Diviſion, we are to diſtinguiſh four Kinds of Sand.

1. Pit Sand; conſiſting of little Stones, with Earth among them.

2. River Sand; conſiſting of the ſame Stones only, the earthy Part being waſh'd away.

3. Sea Sand, conſiſting of the ſame Stones waſh'd clean in the ſame Manner, but with a Saltneſs from the Sea Water, and ſome Pieces of Shells among them; and ſometimes farther enriched by decay'd Sea Plants, and Animals.

4. Shelly Sea Sand; conſiſting altogether of broken Pieces of Shells impregnated with Salt, from the Sea Water.

To theſe may be added a fifth, but baſtard Kind, that is, the Grit of Roads.

Theſe ſeveral Kinds the Farmer is careful to diſtinguiſh, for they are very different in their Effect and Value; and ſome of them are able to anſwer Purpoſes to which the others are not at all fitted.

Where the Uſe of Sand is only to break and divide a tough Soil, the cleaner it is the better; becauſe the cleaner the ſharper: therefore River Sand is preferable to Sea Sand for this Purpoſe. The common Sea Sand owes its particular Value above that of Rivers, to the Salt: the Uſes of which will be ſhewn at large in a ſucceeding Chapter, where Salt will be treated of as a Manure.

If the Farmer have cold clayey Grounds, where nothing is required but to break and warm them, common Sand anſwers this Purpoſe.

Pit Sand will do; but any other Kind anſwers better. The Farmers ſay Pit Sand has not ſo much Fertility as River Sand; but the Truth is, the earthy Matter that is among it blunts the ſharp Edges of the little Stones, which are to do their Buſineſs by breaking and dividing the Clay.

For this Reaſon clean River Saud is much better on that Occaſion, and where that is not to be had, it is better to uſe the Grit out of Roads, or the ſandy Subſtance which remains in the Roads, when the light Dirt has been waſh'd away by the Rains. This is very ſharp, and breaks the Earth excellently.

When beſide Warmth, the Farmer wants to give Richneſs to his Land, let him mix well rotted Dung; or freſh Hog's Dung, or Poultry Dung with his Sand. In this Way of uſing it, Pit Sand does as well as any, and I have ſeen very great Effects of this mix'd Manure upon a Piece of Land in Shropshire, where before nothing grew but the pooreſt of Weeds.

Another Way there is by which the Farmer may make common Pit Sand very uſeful: this is by laying it in the Way of enriching Ingredients. Thus when he cannot fold Sheep, let him have a Sheep-houſe to feed them in, and let him lay on a deep Covering of common Sand. This as it receives the Dung and Urine of the Sheep, will become very rich, and may be removed from Time to Time, and freſh put in, till a large Quantity is well impregnated.

Pit Sand does better for this Purpoſe than any other, becauſe the earthy Matter that is about it detains the Moiſture that drains upon it.

When the Huſbandman is to improve a cold clayey Land with Sand, let him remember that all he lays on it will be of no Effect without frequent and careful Plowings; by Means of theſe, the Sand mixes thoroughly with the Clay; and it would otherwiſe in great Part run in between the Clots, and lie unmixed and uſeleſs.

Clay thus mix'd with Sand yields to the Plow, and receives the Rains freely: and it takes any Kind of rich Manure afterwards.

Loamy, gravelly, or chalky Soils, can never be improved by Sand, merely uſed as Sand; and I ſuppoſe no one would think of laying it upon his mellow Earth, unleſs he wanted to impoveriſh inſtead of improve his Land. The only Soil therefore on which it can be uſed in that naked and ſimple State, is the clayey. In delivering therefore the Methods of uſing it on that, I have ſhewn all the Uſes of Pit Sand, River Sand, and the Grit of Roads.

We come now to the Uſes of the two Kinds of Sea Sand; the proper Sea Sand, which is like River Sand, but Salt; and the ſhelly Kind.

Theſe two are not ſo limited in their Uſe; for Salt and Shells are both of them very ſerviceable for the enriching of Land: and the Sea Sands are therefore uſeful in Proportion as they partake of them. There is alſo a farther Conſideration in reſpect of ſome Kinds of Sea Sand; that is, that it contains a great deal of decay'd Animal and Vegetable Matter, from the Bodies of Fiſh, Weeds, and other Things that die and rot among it. 'Tis only ſuch Sand as lies quiet that can have this Advantage, but it is very great, for nothing is ſo rich as decay'd Plants and Animals.

The Sea Sand that is taken from a plain Shore, is commonly no Way enrich'd but by the Salt it contains: that which lies in Creeks and among Rocks, where it is leſs diſturb'd, and where more Weeds grow, and more ſmall Animals live, is commonly of the rich Kind laſt mentioned; and that which is taken up on Beaks and Points of Land, uſually conſiſts almoſt entirely of Shells. The Point of the Iſland of SHEPEY in KENT, is cover'd to a great Depth with broken Shells in this Manner. At the Surface there lie whole Shells, and large Fragments; but under theſe is a Quantity of them broke ſo ſmall, that they paſs for Sand, and are called ſo by the Fiſhermen, though the Point itſelf is called SHELLNESS.

For the Farmers more perfect Information, I ſhall ſpeak of theſe three Kinds of Sea Sand ſeparately.

Firſt, of that which has its peculiar Virtue from the Salt only, having few or no Shells, or Fragments of Shells among it: this is beſt when it is ſofteſt. The Harſhneſs of common Sand is a valuable Quality in it, becauſe it is uſed principally to cut and break the Clay: but as this Sea Sand is employ'd to enrich, there needs not in it this Sharpneſs: and the Sand of the ſmalleſt Grain is obſerv'd always to be the ſalteſt.

Of this Kind of Sand the redeſt is prefer'd to that of other Colours, by the Farmers upon the SUSSEX Coaſt and elſewhere. This they have learn'd from Books: but what is there written has been founded only on particular Inſtances, and ſhould not have been made general. The People of CORNWALL were the firſt that uſed Sea Sand as a Manure: and they found the red Kind the beſt; the Reaſon of which is, that the red happens to be the fineſt grain'd Sand on the Coaſt of CORNWALL; but this is not the Caſe every where: on the contrary, they have on the SUSSEX Coaſt a pale yellow Sand, which is much finer and better than the red; but they prefer the red, becauſe they have been told it is beſt.

This may ſhew the Benefit of our Method in this Work, of explaining every where the Reaſon, as well as laying down the Fact. Otherwiſe what is meant for Inſtruction often miſleads.

The Farmer who has his Choice of Sea Sand, will know for the future that the ſofteſt and fineſt Sand of this Kind, is the beſt without having any regard to its Colour.

They ſay in SUSSEX the largeſt grain'd Sand gives the moſt laſting Fruitfulneſs, though the fine ſmall-grain'd Sort I have named, has the ſpeedyeſt Effect; and the greateſt at firſt. They fancy the other gives this more laſting Benefit, becauſe they can ſee it longeſt in the Ground. This may be true when it is a clayey Soil that it is uſed upon, but that's a particular Caſe. Otherwiſe the Salt that is among the Sand is the great Enricher; and it is of no Uſe that the Sand remains when that is gone.

Some drag up this Sea Sand from under pretty deep Water, where it is always cover'd by the Sea: but that which lies on the Shores, and is wet and dry as the Tide is in or out, is much ſalter and better. I write this from Experience. But it ſhould always be taken up wet for the Uſe of the Huſbandman, and carried to his Land as ſoon as it is a little drain'd; and then the ſooner it is plow'd in, the better.

The Sand from deep Water coſts moſt, becauſe of the Trouble of getting it up: it commonly coſts twice, ſometimes three times as much as the other. The Farmer naturally thinks it better becauſe it is dearer; but I have certain Proof from repeated Trials, that it is worſe. I have ſeen as much Effect from ten Ton of the Shore Sand, as from fifteen of the deep Water Kind.

The Soil which this Sea Sand beſt ſuits, is a poor clayey or loamy one: the Quantity to be laid on is from eight to eighteen Tun to the Acre: I have ſeen five and twenty Tun laid upon an Acre, where it was ready and came cheap; but this is too much. In other Places where the Sand has been a great Way to fetch, I have known a Farmer ſatisfy himſelf with two or three Tun to the Acre; but he might as well have done nothing.

From theſe ſmall Quantities there can come no good: and from the laying on an Overload, it is eaſy to ſee what Damage may be done. For firſt, the Quantity of Sand may be too much, and the Soil may be injur'd in the End, by being made too ſandy. Then as to the Saltneſs, that may be over-done; eſpecially when the Sand is laid on very wet, as it uſually is where they lay on ſuch great Quantities, and that for the ſame Reaſon becauſe it is near. And we know by all Experience, that although Salt in a due Degree enriches Land, yet in too large a Quantity it cauſes Barrenneſs.

I would adviſe the Farmer to manage this valuable Manure, when he has it conveniently, in this Manner. Let him dreſs his worſt Lands with it: for I have ſeen barren clayey Grounds which produced nothing but Fern, brought to yield very good Crops, by this Uſe of Sea Sand, with a very little Dunging afterwards.

As to the Quantity, I adviſe in general nine or ten Tun to an Acre, and as this Manure takes Effect immediately, I would have the firſt Crop Wheat. In marled Lands it is better to have the firſt Crop, Oats, becauſe the Land does not come to its Strength the firſt Year. But after this Manure, the firſt Crop being Wheat, the Farmer may have three other good Crops of Corn, and after that it is adviſeable to lay it down for Paſture for about five or ſix Years; mowing it

the firſt Year; and afterwards feeding Cattle on it. For it is obſerv'd by all the Farmers, when this Manure is uſed, that the Graſs rais'd from it, exceeds all other Kinds in Sweetneſs.

The Warmth this Manure gives to Land is ſurprizing. The Snow ſcarce ever lies upon thoſe Grounds that have been well ſanded; and partly the Warmth, partly the Richneſs of the Manure, makes a Spring even in Winter.

We now come to the Conſideration of the Sea Sand, taken from ſtill Places among Rocks, and in Creeks: this, beſide its Salt, has ſuch a vaſt Richneſs from the decay'd Plants and Animals, that a little of it goes a great Way; and there is no Land whatſoever that will not be improved by it. Even in ſandy Soils the Addition of the Sand, unleſs it be a very dry one indeed, will do little Harm in Compariſon of the good of the Animal and Vegetable Part.

This is uſed in many Parts of Cornwall with ſurprizing Benefit: beſide the Advantage of Salt and Sand, it contains the richeſt of all Manures, and ſucceeds in a very moderate Quantity: five Tun to an Acre is a very fair Allowance; I have ſeen Crops from it that were aſtoniſhing; it ſuits very well with Wheat, but beſt of all with Barley, and it gives a Richneſs to the Ear. The Stalk of Barley ſown on this Ground is remarkably ſhort, but the Ear ſurprizingly long and thick; 'tis often two thirds of the Length of the Stalk or more. This has been ſaid of the Manure by Sea Sand in general, but in Cornwall where this Barley is ſo fine, I have obſerv'd that it is where the foul Sea Sand, for ſo they call it, has been uſed. In other Places it is very fine, but it is this enrich'd Sand that gives it the great Fruitfulneſs.

The Graſs that grows upon thoſe Lands, that have been manur'd with this Creek Sand, is like the Corn, preferable in Richneſs to any other. This is found by the Graziers, for none feeds Cattle like it: 'tis like the Barley, ſhort but full: it does not run to Stalk, but the Leaves are numerous, and the Head rich. It is always full of white Clover, which is a very nouriſhing Graſs, and there is ſuch Heart in the Land, that the Growth is very ſpeedy, and the Sward always freſh, however it is eaten.

Other Sands may agree with particular Soils; but the Farmer who has this within any moderate Reach, is ſure of a Treaſure: for let his Land, be of what Soil it will, this agrees with it; and it need not be renewed oftener than once in ten or twelve Years.

In the laſt Place, I come to conſider that Sort of Sea Sand which contains a great Quantity of Sea Shells, or which is altogether made up of Pieces of broken Sea Shells, and is thence called Shell Sand. This has the common Advantage of Sand, even tho' it be that conſiſting of Shells only, for it will break and divide a tough Soil: but it has the farther Benefit of enriching it in a very conſiderable Manner.

There are two different Accounts on which Sea Shells enrich a Soil. In the firſt Place, theſe Shells are in their Nature ſomething of kin to Marle, eſpecially when they have been well calcin'd; and that is the Condition of thoſe which are thus broken, and expos'd on the Shores. In the next Place, as they have been a Part of Animal Bodies, they partake of an Animal Nature: and all Things whatever that do ſo, are rich.

This Sand agrees excellently with barren heathy Land, that has a clayey Soil, and is naturally over-run with Fern and Fuzzes. The common Hazel Mould is alſo greatly enrich'd by it; and the Fruitfulneſs which it gives continues a long Time. The Corn which grows on theſe Lands has always a ſhort Stalk, and a large Ear; and the Graſs is ſhort alſo, but it is always thick, juicy, and ſweet.

The Colour of this Sort of Sand may give ſome Rule for judging of its Quality. The more Shells or ſhelly Matter it contains, the richer it is; and the leſs that ſhelly Matter is calcin'd, the longer the Improvement made by it laſts; though on the other hand, the whiter it looks, the ſooner the Effect is ſeen. This is very natural, becauſe the white Shells are calcin'd already, and give out their Virtues at once. The others are to be calcin'd by the Sun and Air as they lie on the Ground: this is done gradually, and the Improvement advances in the ſame Manner.

This is ſeen very evidently in the Effect of the ſhelly Sand in Suſſex, and that in Cornwall. The Suſſex Kind in general conſiſts of a good deal of yellowiſh Sand, with a great Quantity of broken Shells in white Pieces among it. Theſe are Cockle Shells for the moſt Part, broke by the Daſhing of the Water, and calcin'd by laying on a flat Shore. The Corniſh ſhelly Sand is blueiſh or aſh-colour'd; for it conſiſts of ſome white Sand, with a Quantity of broken Muſcle and Limpet Shells: theſe not being expos'd in general on ſo flat a Shore, are leſs calcin'd by being left dry to the Sun and Air.

The Suſſex ſhelly Sand enriches Land immediately in the Manner of Dung; but it does not well ſupport more than three Crops of Corn; after which they have five or ſix Years good Graſs, and then repeat the Dreſſing.

On the other hand, the Corniſh Kind does not ſhew its Effects at once, but the four or five ſucceeding Years it yields excellent Crops of Wheat or Barley; and after that, affords a much ſtronger Graſs, though as ſweet as the other.

CHAP. XIII.

Of the Uſe of Gravel as a Manure.

I AM ſenſible that many Things are mention'd here to be conſider'd as Manures, which will ſurprize the unexperienced Reader; and this of Gravel is one of them. But 'tis from Practice all that is here written on them is deliver'd. Thoſe very Things which of themſelves make very bad Soils, ſerve to improve others. Sand and Clay are two Inſtances of this, and Gravel, as will be ſhewn, is a third.

Gravel making of itſelf a hot Soil, is good to be uſed to thoſe which are naturally cold: this is a firſt general Principle. Cold Lands are moſtly tough: now the Gravel at the ſame Time that

that it warms, breaks them; and gives way to Rains, and to the Roots of Plants.

As breaking the Toughneſs of the Soil is uſually one Point to be aim'd at in the Uſe of Gravel as a Manure; the beſt Kind for that Service, is that which is full of rough and ragged Flints, and other Stones. This will warm a Soil as much as that Gravel which conſiſts only of round ſmooth Pebbles; and will break it a great deal more.

As they are uſually clayey Grounds that are improved by Gravel, the Farmer muſt take Care there is no Clay hanging about the Stones, as is the Caſe naturally in many Pits: and he will do well to have all the large Stones pick'd out, they being only hurtful.

In BUCKINGHAMSHIRE I have ſeen a Clay Field manur'd with a rough Gravel firſt, and afterwards with Dung: and the Conſequence was a very good Crop. The Dung had been thrown away upon it many a Year before; but the Gravel made way for it, at the ſame Time that it warm'd the Soil from its own Nature.

But I muſt inform the Farmer that this was a ragged flinty Gravel, and there were few Stones bigger than a Walnut.

Another Improvement I ſaw by Gravel in NORTHAMPTONSHIRE, in a different Way, but this was alſo in a clayey Soil. The Farmer had thrown away a great deal of good Dung upon it, as is often done upon Clays, when at length an Accident relieved him. The Soil was very ſhallow in his Grounds, and underneath it lay a flinty Gravel with a great Quantity of petrified Oyſterſhells among it. He one Year plowed deeper than ordinary, and turn'd up a good deal of his mix'd Gravel with the Soil, and the next Crop was four Times greater than the Land ever produced before in the Memory of the oldeſt Inhabitants.

It is to be obſerv'd, that the Gravel in this Place was improved by the petrified Shells, in the ſame Manner as Sea Sand often is, by the broken Shells that are mix'd among it, as named in the laſt Chapter. Many other Sea Shells when petrified, become abſolute Stone; or there is nothing but a Lump of Stone bearing their Reſemblance; but in Oyſterſhells it is often otherwiſe, and in none ſo much as thoſe of this County: they are turn'd up very frequently, and though in part ſtony, they have always ſomething of the Shell remaining. They are flakey, and ſplit and moulder to Pieces, after being a little expos'd to the Weather, and act entirely as calcin'd Shells. For I have obſerv'd, that wherever there are Sea Shells found in the Earth, if they are not petrified, they are always brittle, and as it were calcin'd.

The only Kind of Soil beſide the clayey, in which it can ever be proper to uſe Gravel as a Manure, is that which is the moſt nearly allied to it, the loamy Soil. I have ſeen where the Sand in this Soil has been ſo little in Proportion to the Clay, that the Earth always roſe in great Clots from the Plow, and got into Cakes with the Wet. In ſuch a Soil I am certain Gravel would be a good Addition.

I don't ſpeak this from Experience, but only from Conjecture, but it is a Conjecture founded on Reaſon. For the Gravel would prevent the Soil from running into great Cakes and Clods; and the Sand would then be able to keep the leſſer Lumps a little divided.

CHAP. XIV.

Of the Uſe of Stone as a Manure.

EVEN after treating of Gravel as a Manure, I ſhould be afraid of naming Stone on the ſame Occaſion, were not ſuch uſe of it ſupported by Practice, and confirmed as to the Benefit by frequent Experience in OXFORDSHIRE, and ſome of the adjacent Counties.

The Practice, however ſingular it may appear, has its Foundation in Reaſon. In ſpeaking of the Soils in the firſt Book, I have nam'd ſome of the ſtony Kind, which the Farmer likes better than the ſame Kind of Grounds where there are no Stones among the Earth.

I have alſo in treating of Gravel, advis'd the Huſbandman to prefer ſuch as has rough and irregular ſhap'd Flints among it, to that which conſiſts entirely of round and ſmooth Pebbles: and that for a very plain Reaſon.

Now on theſe two Obſervations, the Uſe of Stone as a Manure, is ſeen as ſupported both by Experience and Reaſon. If of two Fields otherwiſe the very ſame in Soil, the one having Stones among it, is more fruitful; and the other not having any, is barren; it is plain that Stones being laid on a barren Ground of that Kind, will improve, and make it fertile.

In the ſame Manner Reaſon ſhews, that if that Kind of Gravel is beſt for Manure which is fulleſt of rough Stones, they being more apt to break the Toughneſs of a Soil; then a Parcel of ſuch rough Stones without any Pebbles at all, muſt be better than any Gravel whatſoever, for that Purpoſe.

Again, as the ſecond Uſe of Gravel is warming the Soil, it is certain that Pieces of Lime Stone, and the like, will anſwer that Purpoſe better, than the Pebbles of which Gravel is uſually, for the moſt part, compos'd, becauſe theſe Stones are in their own Nature warmer than Flints and Pebbles.

Having in this Manner ſhewn the practical Huſbandman the Reaſon of the Thing, I ſhall now add what is known from Practice.

In OXFORDSHIRE it is no uncommon Thing, to meet with large Tracts of a cold, tough, and very indifferent Soil. They beſtow a great deal of Manure of the common Kinds, upon this in ſeveral Places to very little Purpoſe; but about BANBURY, particularly at HORNTON, they have found a Way of manuring it with the Chippings of Stone to great Profit.

There are Quarries of Stone in that Neighbourhood; and the Pieces that fly off in hewing out the Blocks, are ſpread upon theſe plow'd Lands, and work'd in by Degrees, mixing thoroughly with the Soil, and giving it a laſting Fertility.

It is no wonder the Benefit ariſing from theſe is laſting, for the Manure muſt remain a long Time, and though theſe Pieces of Stone break

by Degrees with the Weather, they ſtill retain their Power of dividing the tough Soil.

We have a very antient Record of the Uſe of Stones, in rendering the Earth fertile. Some Foreigners who came to Syracuse, and practis'd Huſbandry, intended great Improvements in all the neighbouring Lands. The firſt Step theſe indefatigable People took was, to pick out all the Stones from the plowed Lands; and this they did ſo carefully, that after three Plowings there was not a Pebble of the Bigneſs of a Nut to be found any where. They then went to Sowing, but the Lands produced ſcarce any thing. The Crops were nothing to what they had been before. And the new Farmers could make nothing of their Undertaking, till they had laid the Stones on again.

After this they continued their other Labours of deep and often plowing, weeding, and the like, in which they were more induſtrious than any People, and they then ſucceeded. The Manures they had uſed when the Stones were off took no Effect; but as ſoon as they were laid on again, they enriched the Land according to their Nature.

This ſeemed a Sort of Miracle to the People of that Time. They made Nature a Goddeſs, and ſaid ſhe would not be put out of her Courſe. But the Farmer who has read this Work hitherto with Care, and underſtands the Nature of cold Clays, and the Reaſon of their Barrenneſs; as alſo the Effect of Stones in breaking and dividing ſuch Soils, and giving way to the other Manures to enter into their Body, and for the Corn to ſhoot out its Stalks, will be able to give an Account of this impoveriſhing the Land, by removing the Stones, and enriching it again, by laying them again in their Places, without having Recourſe to Goddeſſes and Miracles.

It has pleaſed God, the Creator of the Earth, to cover it with different Soils, and in ſome Places to leave them more barren, in others naturally improved. We are to uſe our Underſtanding in obſerving what is the Kind of that natural Improvement; and our Induſtry in imitating it: for imitating Nature is obeying God.

We ſee from the old Inſtance at Syracuse, and the modern Obſervations in Northamptonshire, that Stones, eſpecially the rough Kind, being in a Corn Land, are a great Advantage to its Fertility. Nor is the Practice of that Part of Oxfordshire I have named, either new or particular. It is not new, for it is mentioned as in common Uſe by Dr. Plot, who wrote near eighty Years ago; ſo that, doubtleſs, it is there a Practice of more than a hundred Years ſtanding; nor is it particular, for I have ſeen it done in Sussex in more than two or three Places. They there lay on the Bits of Stone with the Dung; but the other is the better Practice.

CHAP. XV.

Of the Uſe of Chalk as a Manure.

I HAVE been ſpeaking of ſome uncommon Manures, I now come to one which is well known, and frequently uſed; but which never can be too much conſidered; or when rightly underſtood too much employ'd.

Chalk is one of the moſt diſtinguiſhable Manures in its Effects, which laſt a great while, but are apt to leave the Land poorer than it was at firſt, unleſs ſome Care be taken to prevent that Miſchief.

A great Benefit of Chalk is, that it agrees perfectly well with the two worſt Soils we have. A tough Clay, or a bare Sand, are both greatly improved by it. But of this it muſt be obſerved, as of other natural and earthy Manures, that it makes way for other Dreſſings; and prepares the Ground that it improves, for being enriched by every other Means.

Chalk is a general Name, as has been obſerved before, comprehending many Kinds of this white Subſtance, of different Degrees of Hardneſs, and fit for various Purpoſes; the Farmer is therefore to take Care that he chuſes a right Kind.

The common Servants will be able to inform him, that his Chalk muſt be crumbled to Powder by the Weather, before it is fit to anſwer his Purpoſe. He will therefore naturally and juſtly prefer that Chalk, which is beſt ſuited to receive the Effects of the Air; that is the ſofteſt.

Chalk burnt into Lime, is uſed with great Benefit as a Manure; and this Effect of the Air, in breaking and mouldening it to Powder, is a Sort of Calcination, though in a leſs Degree. It is preferable to the other in the End; for as it is leſs violent, it leaves more Heart in the Chalk, which is the Occaſion why the Effects of Chalk laſt, by many Years, longer than thoſe of Lime, though the Effect of Lime is more ſpeedy.

The Farmer may be ſure that the Chalk which is ſofteſt and fatteſt, is the moſt free to take the Influence of the Sun, Air, and Rains. This will not only break much ſooner, but breaks alſo more perfectly than the ſtony Kind; and it is therefore always to be prefer'd, though brought farther and at more Expence.

The hard ſtony Chalk will ſcarce break at all. I have known many a Farmer make a great Miſtake, by ſuppoſing it would mellow and break when in his Land. He has therefore plowed it in, in Lumps, after its being expoſed the uſual Time to the Air. Such have more than once complain'd, that their Chalk took no Effect; and I have ſhewn two or three of them the Reaſon, by taking them to their Ground, and making them ſee the Lumps of Chalk lying quite unalter'd in the Soil after two or three Years.

There are Chalks ſo ſtony that they will hardly break with the Weather at all. Theſe the Huſbandman is to reject, unleſs he intends to burn them to Lime. The Chalk he is to chuſe is the ſoft mellow Kind, which uſually lies at a ſmall Depth in the Ground, under a Coat of yelloviſh marly Clay. I have found Beds of this Chalk in many Counties; and always cover'd in this Manner.

This Kind really approaches to the Nature of Marle, and a Winter's Froſt and Rain never fail to reduce it to a Condition of mixing thoroughly with the Soil. Being mix'd in this Manner with the toughſt Clays, it brings them into a light and hollow Condition, in which the Rains and Weather penetrate them thoroughly, all rich

Manures enter perfectly well into their Subſtance; Corn can eaſily ſhoot through them, and they yield with Freedom to all the Inſtruments of Huſbandry.

What an Advantage is this to the Huſbandman, to have a Soil that works eaſily, takes Dung well, and gives free Growth to his Crop, at the ſame Time that it has a ſufficient Body to hold up the Stalk. This is a Benefit he can only have from his Knowledge and Induſtry. It is the Soil he makes out of a Clay well chalk'd and well dung'd, for there is no ſuch in Nature.

Indeed there is no Inſtance wherein the Mixture of Soils ſo plainly ſhews its Advantage, as that of Chalk and Clay. Both are naturally barren; but being mix'd they are capable of producing any thing.

Chalk takes the greateſt Effect upon thoſe Lands, which have no Mixture of it in their own Nature; nor have ever had any of it laid on them before. In theſe Caſes it changes the very Nature of the Soil. One plowing upon a Clay Land that has been chalked, will go as far as three upon one that has not; and ſuch a Soil, inſtead of being ſlow in its Produce after this chalking, puſhes too faſt, and if not preſerved by rich Manures, or recovered by due Reſt, after a proper Time, will be perfectly exhauſted.

To prevent this Accident, which has caſt a Reproach upon chalking of Land, that it enriches the preſent Poſſeſſor, but ruins the next; I adviſe the Owner who dreſſes his proper Land, or the conſcientious Farmer, not to lay on his Chalk, as is the Cuſtom, alone, but to mix one Load of mellow Chalk with three Load of Dung, and a Load of River Mud, in order to ſpread upon his Land. This will keep it in heart, as well as give it that puſhing Quality: and it will, after the Power of this is over, receive another Dreſſing of Chalk with the ſame Benefit as the firſt, without any Time of Reſt.

The chalking of Lands in this Manner, will anſwer like the marling of them in ſome Parts of England, where they renew the Dreſſing once in ten or twelve Years, and keep working the Land from one Generation to another.

The Fault therefore that is charg'd upon Chalk, is rather to be laid at the Door of the Huſbandman. There are many Ways of ruining a Piece of Land, and this is one. But the Chalk may be ſo manag'd, as to enrich it for ever.

I have obſerved that Chalk does beſt upon thoſe Lands, which have nothing of it in their own Nature; and that the Farmer generally ſucceeds beſt with it, who brings it fartheſt. This muſt not appear an idle Report, for it is founded on Experience. In Buckinghamshire they bring Chalk from Pits, opened for it in particular Places. In many Parts of Hertfordshire, where the Chalk runs in a thick Bed, at ſome Depth under the Soil, they dig for it in the Middle of the Field where they intend to uſe it: Chalk, upon a proper Soil, will do great Service any where. But I have found, by a careful Obſervation, that although of great Service in both theſe Counties, it is of much the greateſt in the former.

The Quantity of Chalk laid on in theſe different Places, may alſo ſhew that it takes much more Effect in Buckinghamshire, where it does not lie under the Land on which it is laid, than in Hertfordshire where it does: for the Farmers are always guided in their Quantity of Manures by Experience. In Buckinghamshire they lay fourteen Load of Chalk upon an Acre; in Hertfordshire the common Allowance is twenty-five or thirty Load; and the Effect in the former County, allowing the Lands to be the ſame, is conſiderably greater, as obſerved already.

This greater Effect from a ſmaller Quantity of Chalk, I take to be owing to there not laying a Bed of it under the Soil in Buckinghamshire, for I ſuppoſe if there did, the Farmers would not go farther to ſeek it, any more than their Neighbours. The Soil, it has been ſhewn already, uſually partakes of the Nature of the Beds of Matter that lie under it.

In Hertfordshire the Effect of a good chalking laſts twenty Years, if the Farmer underſtands his Buſineſs, and does not over work it: in Buckinghamshire, where but about half the Quantity is uſed, it muſt be allowed, it does not laſt above fourteen or fifteen Years: but then the Land, in the former Inſtance, is ruin'd; whereas, in the latter, if a little Care has been taken, as directed already, in the firſt Dreſſing, it is ready to receive another, with the ſame Advantage.

The Farmer muſt dig his Chalk in the Beginning of October, and let it be expoſed to the Rains and Froſt all the Winter; in Spring it muſt be beat and ſpread about, and plowed into the Ground. After this the Corn is to be ſown, if Barley, and a fair Allowance of Soot ſpread over it. This is the common Practice where this Manure is beſt underſtood, and the Profit they reap from it is more than can be imagined.

This is the general Rule, but the practical Reader is to ſuit it to his particular Occaſions. If he have a very fine and ſoft Chalk at hand, he may lay it on immediately from the Pit in Spring. Nay it is the beſt Method for a Chalk that is ſo very mellow; for the Sun and Air, during the Winter, only exhauſt ſuch a Chalk as this; and are not needful for the reducing it to Fineneſs.

On the contrary, if he can get no other than an hard and ſtony Kind of Chalk; let him break it tolerably ſmall, and expoſe it upon a Lay a Year or two before it is plowed up: this will give it Time to ſoften, ſo that it may the better mix with the Soil when plowed in; and, at the ſame Time, the Rains will be waſhing ſome Virtue out of it, which will be gradually received into the Land whereon it has lain.

The Uſe of Chalk is, in a Manner, confined to Arable Lands; but I ſhall give the Farmer a Piece of Advice, with regard to the laying it on his Paſtures; and in this I ſhall ſpeak from what I have try'd on my own.

The firſt Year I uſed Chalk on my Paſture Grounds, I was afraid I had thrown away my Labour, and perhaps many have been diſcouraged from the Uſe of it in the ſame Manner, by a Trial the Effects whereof they did not ſufficiently regard. I perceived that my Graſs was not a whit the taller or fuller for it; and therefore I at firſt thought it did no good: but I ſoon found by my Cattle, and in my Dairy, that Chalk

gives a Body, or Richneſs, and Sweetneſs to the Graſs, though it does not encreaſe the Quantity: my Cattle fatten'd better upon this than I ever knew them upon any Paſture of the ſame Kind without chalking; and I never ſaw ſo rich Milk as I had from the Cows fed upon that Cloſe.

I recommend chalking of Paſture Grounds therefore, from my own Practice and Experience, to every Farmer, as much as laying it on his plow'd Lands: but herein I muſt give him a Word of Advice.

Chalk muſt be very mellow and crumbly before it is laid on a Paſture, otherwiſe it does more harm than good. If it be ever to mellow in its own Nature, it muſt lie a while expos'd to the Weather; and the harder it is, ſo much the longer it muſt lie. In a Word, Chalk is never fit to be laid upon Paſture Grounds, till a Man can crumble any Lump of it to Pieces by treading it, or rolling it about a little under his Foot.

In ſome Parts of England the Farmers ſpread Chalk upon their Lands, after they have marled them: but this is quite unneceſſary. It is one of the Practices of the antient Huſbandry, and we know how difficult it is to beat the Country People out of the old Tract. It is recommended by Markham, and others of that Time, who always adviſe the mixing many Dreſſings; and often direct every Sort of Manure whatſoever, to be laid one over another upon the ſame Field.

Theſe Writers may often aſſiſt the Farmer; and it would be better for the Country in general, if they were more obſerv'd than they are: but the Practice of ingenious and induſtrious Perſons ſince their Time has greatly improved the Art of Huſbandry.

CHAP. XVI.

Of the Uſe of Salt as a Manure.

SALT affords the Farmer one of the ſtrongeſt Inſtances of that excellent Rule, that Things may be good in Moderation, though deſtructive in Exceſs. We read of Fields ſown with Salt in order to make them barren: but we alſo know by Experience and Obſervation; from what we ſee in Nature, and what we are able to effect by Art, that Salt in a due Proportion is a great Cauſe of the Fertility of Land.

Accident, which is as often the Mother of Improvement, as Neceſſity is of Invention, firſt led the Way to the Uſe of this rich and excellent Manure. But it was Accident attended with Obſervation: for without that, Heaven and Earth point out Advantages to Mankind in vain.

There had long prevailed an Opinion, that Salt gave Barrenneſs to Land, and none would ever have diſputed the Fact, much leſs have thought of Salt as a Cauſe of Fertility, but for the Obſervation of what follow'd where Salt had chanc'd to be thrown upon Lands in a moderate Quantity.

In Devonshire a Piece of plow'd Land happen'd to be overflow'd by a Spring Tide, that roſe higher than any other had done in the Memory of Man. The Farmer who rented it at a ſmall Price, had loſt by it every Year: but the Seaſon ſucceeding this Overflowing, he found his Crop ten-fold; though he had uſed no other Methods of dreſſing or preparing that Field than uſual. This was an Accident, the Conſequences of which were ſo plain, every body muſt ſee them. If Salt added to Land by Accident made it fruitful, the Farmers were ſenſible it would have the ſame Effect if added purpoſely with that Intent. On this plain reaſoning they began the Practice, and it ſucceeded happily.

This was the Introduction of Sea Salt as a Manure in Devonshire, which is the Place, by all I can learn, where it was firſt uſed in England.

Worcestershire appears to be the next Part of this Kingdom where it came into Repute, and that alſo from the Obſervation of an Accident, though of another Kind. As in Devonshire, they were in the Reach of Sea Water; in Worcestershire they have Salt Springs. The Water of theſe is a perfect Brine. It is much ſtronger of Salt than Sea Water is any where, and the Salt is of the ſame Kind.

It had been long obſerv'd in that County, that when this Water dribbled to waſte, the Ground was quite barren over which it ran; but that all about thoſe Places, the Graſs grew much fuller and finer than elſewhere. Upon this they began to uſe Salt, or weak Brine in moderate Quantities; firſt on their Paſtures, and afterwards on their plow'd Lands; and the Conſequence was, the enriching of them both in a Degree not to be obtain'd by any other Manure, which they could command in that Part of the Kingdom.

After this, People obſerving the Growths upon thoſe Salt Marſhes that lay at a favourable Diſtance from the Sea, and had the Benefits without the Miſchiefs ariſing from Salt Water, began on comparing them with what was practis'd in the before-mention'd Counties, to underſtand truly the Nature of Salt as a Manure, and have ever ſince uſed it accordingly.

This was the Introduction of that Manure into the Practice of Huſbandry, which has now ſpread very far; and it were to be wiſh'd would extend itſelf univerſally.

We find the old Writers on Huſbandry in our own Language, acquainted with the Uſe of Salt much better than thoſe who condemned it at all Adventures, as a Cauſe of Barrenneſs. They underſtood the Advantage of Sea Sand over River or Pit Sand, and they were ſenſible that this was owing to the Salt it contain'd.

On this Principle they proceeded when they advis'd thoſe Farmers who lay too far from the Sea, to have the Advantage of Sea Sand, to ſprinkle Salt upon their Corn Lands. They preſcribe the ſpreading of this in the Manner of Corn, thinly and evenly over the Ground: they call it ſowing of Salt, the Quantity they direct the Farmer to uſe is two Buſhels to an Acre.

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One Thing farther I muſt obſerve to the Credit of theſe Authors. They all direct Bay Salt, and it is certain that Bay Salt is more of the genuine Nature of Sea Water than any other. This Kind is made by expoſing the Sea Water to the Sun and Winds in ſhallow Pits dug in the Earth: and the common white Salt is made by boiling Sea Water over the Fire. This laſt Method evaporates every Thing that was in the Water, except the Salt and ſtony Matter only; and it is plain enough perceiv'd, becauſe this has no Taſte but Saltneſs: whereas the Bay Salt which has had no other Heat but that of the Sun, has a ſenſible Taſte, and contains more of the natural Principles of the Sea Water. This is plainly diſcovered in eating; and not leſs palpably by its Effect on Land.

The ſteeping of the Grain that is to be ſowed in Brine, is a Practice known all over ENGLAND, and the Advantages of it are well underſtood. Of this more in its Place hereafter; but it is not amiſs to obſerve here, that this Practice confirms the Account, that Salt in Moderation is uſeful to Land. It was a Thing diſcover'd by the ſame Means, by perfect Accident. The Loading of a Ship that was caſt away was Wheat: the Wheat was afterwards ſowed, and being ſown, it was found to thrive better than any other.

This ſoon brought into Uſe the ſteeping Seed Corn in Brine, and Practice confirms that it not only makes it grow ſtronger, but prevents Smut.

The Mud out of Salt Water Ditches has been of late brought into Uſe in ESSEX; they mix it with Lime and mellow Chalk, and it makes an excellent Dreſſing for the pooreſt, and moſt barren Lands.

Upon the whole: The Farmer can never do amiſs who uſes Salt in the Deſign of fertilizing his Corn Lands, except he uſe too much. Moderation is the great Rule of Life: he that can't practiſe it will thrive in nothing. I would adviſe in the firſt bringing barren Lands to Fruitfulneſs, to uſe at leaſt three Buſhels to an Acre: afterwards one Buſhel to an Acre is ſufficient. It ſuits all Soils whatſoever, and the beſt Time of laying it on is with the Corn in ſowing; for the firſt Rain thoroughly diſſolves it: it then penetrates the Surface, and is of Uſe to the Shoot as ſoon as it is made.

CHAP. XVII.

Of the Uſe of Sea Weeds as Manure.

WE have not yet done with the immediate Products of Nature as Manures. I would have the Farmer perfectly acquainted with the Effect of every Thing that has been, or that reaſonably may be uſed for this Purpoſe: for on theſe more than on any Thing, next to his Induſtry, depends his Succeſs.

The Uſe of Sea Weed is confin'd to thoſe Parts of the Kingdom which are near the Sea Coaſt, for it muſt be uſed in ſome Quantity: but it is an Advantage too many neglect, who have it thrown as it were into their Mouths: and few that can be offer'd, are greater.

The Uſe and Value of Sea Weeds as Manure, depend upon the plaineſt Principle in the World. All Vegetables whatſoever are rich Manures when in a State of decay: Salt we have alſo ſeen is a very rich Dreſſing: now Sea Weeds have the double Advantage of their own Vegetable Nature, and of the Sea Water in which they grow.

Nay, there is ſomething yet more than this in favour of their Richneſs. Curious Perſons who have examin'd them according to Chemiſtry, have found that they contain much the ſame Principles as Animals: and it has ſince that been diſcover'd by the Help of Glaſſes, that they are always crowded with little Inſects that live upon their ſlimy Surfaces, or in their little Hollows. This is ſo ſtrongly viſible in many of them, that ſome ingenious Perſons both in ENGLAND and elſewhere, have ſuppos'd them not to grow as Plants, but that they were made by thoſe little Creatures.

Now to conſider the Sea Weeds in this Light, which is conſidering them truly, what a Right have they to the Huſbandman's Regard as a Manure. Firſt, from their Vegetable Nature, for they are really Plants, whatever thoſe Perſons may fancy: in the next Place, from their Saltneſs; and laſtly, and above all from their Animal Nature; for every Thing of the Animal Kind is rich in fruitful Qualities.

Let us examine by Practice whether theſe Reaſonings are right; for all the Reaſonings in the World are to be rejected that are not ſupported by Experience and Fact. Let us look into the Places where this Manure is uſed.

In DEVONSHIRE, upon and near the Coaſt, they uſe the Ouze and Mud drag'd up whereever they conveniently can get at it, as a Manure. They take this, Weeds and all, and let them rot together, before they ſpread them on the Ground: this is a very rich Manure, but in this Caſe the Benefit is laid to the Mud; the Weeds are not much regarded.

In CORNWALL, where the Shores are ſandy or ſtony, and they cannot have this eaſy Advantage of Salt Water Mud, they tear off the Sea Weeds from the Rocks and Stones; and rake together ſuch as are caſt up by Storms. Theſe they lay upon the Ground without any Preparation, plowing them in, and they enrich it to a ſurprizing Degree.

The firſt Year many of the tough Kinds remain almoſt entire in the Soil; but they give a great deal of Fruitfulneſs to it notwithſtanding: the next they generally break and rot, and they continue nearly equal in point of Fertility that, and the ſucceeding Year.

The firſt Year, the Salt and the little Animals that are about them, fertilize the Ground; the next, and the third, 'tis their own vegetable Subſtance which decays, and enriches the Soil; the ſmaller and tenderer Kinds the firſt Year with the leafy Part of the others; and the tougheſt and the remaining Stalks the laſt.

In ſome Parts of CORNWALL they pile theſe in Heaps, and cover them that they may rot before they uſe them. This makes them take Effect in a prodigious Manner the firſt Year,

but they do little the ſecond, and the third leſs. I would adviſe the Farmer to uſe them juſt as he takes them up: for their firſt Effect in this Way is ſufficient to ſatisfy his warmeſt Expectations; and the Benefit laſts longer.

Of all the Manures I ever ſaw uſed, I know none that is ſo quickly ſpent as rotted Sea Weed; but none takes a quicker Effect.

CHAP. XVIII.

Of Sea Shells and their Spawn as a Manure.

THE Farmer who has conſider'd the Nature of ſhelly Sea Sand, as explain'd in its proper Place, will readily imagine that Sea Shells in any State may be uſed as a Manure. They are ſo in moſt Places where they can be had conveniently, and that in different Manners according to their preſent Condition.

Some are taken up freſh on the Shores; others have lain in Heaps expos'd to the Weather: ſome are hard and firm, others ſoft, brittle, and as it were, chalky; and theſe ſeverally require a different Treatment.

Shells in a double Manner have Title to be uſed as a Manure. In the firſt Place, they have belong'd to Animals; and whatſoever has been a part of an Animal, or has any way belong'd to one, is ſure to be uſeful to this Purpoſe: in the next Place, they are, after Expoſure to the Air, of a limey Nature, and every one knows how rich a Manure every Kind of Lime is found.

The Shells taken freſh out of the Sea, or from the Shores, have a bright gloſſy Look, eſpecially on their Inſide, and ſhew frequently ſeveral Colours. Thoſe which have lain to be calcin'd upon the Shores, are all over whitiſh, and have a dead Aſpect, ſo that they are eaſily diſtinguiſh'd: they have ſomewhat the Appearance of Lime; and a Calcination by Fire in the common Way, ſoon brings one or the other to real Lime.

Theſe are the three Conditions in which we are to conſider Sea Shells as a Manure. 1. The freſh Shells; 2. The Shells that have lain on the Shores till they are calcin'd by the Sun and Air; 3. Shells calcin'd by Fire to Lime.

The Farmer is to uſe one or other of theſe according to the Nature of his Ground: the firſt and ſecond are uſually found in the ſame Places, ſo that he has his Choice: and he may make Lime of either at his Pleaſure.

The Progeny or Spawn of Shell Fiſh, is a yet richer Manure than the Shells themſelves. This is found under Rocks, and ſometimes in vaſt Plenty in the Beds of Salt Water Rivers; and is full of diminutive Shells. It diſſolves eaſily: and is ſo great an Enricher of poor Land, that ſcarce any Thing is ſuperior. It is found to be ſo much above Dung, that the Farmers always, where it is to be had, reckon one Load of it equal to three of the other.

When the Ground is poor and heathy, Sea Shells are to be uſed in their natural State; and the freſh and lively Shells are for this Land better than thoſe which have lain expos'd on the Shore till they are bleach'd: but when a tough Soil is to be dreſs'd with them, the beſt Way is to calcine them to Lime. If natural Shells are uſed to a ſtiff loamy Soil, thoſe which have lain till bleach'd, are better than the freſh: for they are reduced to a Condition reſembling that of Lime.

No Shells are to be laid on the Ground whole, for in that Caſe they would obſtruct the ſhooting of the Corn, and it would be many Years before they could give out their Virtue. The Farmer muſt break them with Hammers, or in a Mill before he lays them on the Ground, the ſmaller the better: for then the Air takes quick Effect upon them. Moſt Shells are made up of Plates lying one over another, and when the Air can get freely at the Edges of theſe, they ſplit and ſhiver to Pieces; and then give out their Virtue to every Part of the Ground.

I have ſeen the Proof of this in Sussex; where Shells are uſed both Ways. I have taken up a Shell tolerably entire and ſound, that has been laid on the Land three Years, by one who laid them on whole: and this in all that Time had obſtructed the Growth of the Crops, and given no Virtue, for it was ſtill tolerably firm. Whereas on a neighbouring Farmer's Ground who had ground his Shells in a Mill before he laid them on, nothing was to be found remaining of them but a few thin Shivers; theſe were as brittle and crumbly as the thin Shells we find in Marle Pits; and doubtleſs they are as rich as thoſe.

Theſe broken Shells had been laid on no longer than the whole ones in the other Man's Field; and I doubt not but in another Year, there was not a Scrap to be found: whereas the others would probably remain whole for the Man's Life.

As the Shells that have lain to be bleach'd on the Shores, fall to Pieces much ſooner than the freſh ones: it may be right where the Nature of the Soil renders Lime improper, and where only freſh ones can be had, to calcine them a little. Half an Hour's gentle Fire will do as much to this Effect, as ſome Years lying upon the Shore: and the hardeſt Oyſterſhells, and the like, may be thus made ſoft and crumbly. They will then eaſily break under the Hammer, or in the Mill, and will diſſolve upon the Ground in a Seaſon or two, though their Effect will be ſeen in the Crops for a great many Years.

Thoſe who have underſtood beſt the Nature of Manures, eſpecially thoſe of the richer Kind, have agreed, that they cauſe the great Fertility which always follows their Uſe by raiſing a Ferment in the Land; and ſo dividing the Lumps, and looſening and mellowing the Soil. If this be the Caſe, as appears very probably, then Experience ſhews, that Sea Shells, properly manag'd, are the richeſt of all Manures, for none looſen and mellow the Earth in ſuch a Manner.

A thorough Dreſſing of Shells enriches the Land for many Years, and indeed too much at firſt, for after a few Seaſons when they are well diſſolv'd, they make a Soil that was before ſtiff, ſo light and looſe, that like the moory Land in Lincolnshire, or the fine black Mould in other Places, it is not able to ſupport the Roots

of the Corn. In this Caſe the Farmer is to lay it down for Graſs for a couple of Years, and then plow it again. It bears excellent ſweet Graſs in the Time it is laid down, and afterwards has Body enough to ſupport a Crop of Corn which before it could not.

The Allowance in general where they can be had in Plenty, is twenty Loads of Shells to an Acre: when they are burnt to Lime, they take Effect the moſt ſuddenly, but it does not laſt long. When they are calcin'd a little ſo as to make them crumbly, they affect the Land gradually, and their Virtue will laſt very well twelve or fourteen Years: when they are uſed in their natural Condition, the Effect is ſlower: thoſe which have lain expos'd till they are bleach'd, exert themſelves quicker than the freſh ones; and theſe laſt, as before obſerv'd, on ſome Lands hardly ever take Effect at all.

My Advice to the Farmer is always to uſe this Method of half burning the Shells, unleſs upon thoſe barren and cold Soils where they do beſt as Lime: the other Way they take Effect too ſlowly, and in this Manner, though ſpeedy, they are laſting enough in Reaſon.

In Cornwall they uſe the bleach'd Shells moſtly, and their Effect is very ſtrong for ten or twelve Years; in Devonshire they have principally ſofter and brittle Shells than in Cornwall, as ſmall Cockles and Razor Shells: they ſpread theſe as they find them, and they do very well. About Plymouth the Shells are moſtly of the Muſcle, and other thin Kinds, and they uſe them freſh as they find them, only breaking them with an Iron Stamper, and they do well enough; but in all theſe Places they would anſwer a great deal better with a little Calcination.

In Ireland they uſe the freſh Shells from Lough Foil, or the Bay of Londonderry, beſtowing fourſcore Barrels on an Acre, and the Archbiſhop of Dublin, has given a ſurprizing Account of their Fertility; which is publiſh'd in the Philoſophical Tranſactions. He alſo obſerves their Effect in hollowing and looſening the Ground in the particular Manner already mention'd.

The Advantage that the Farmers about our Sea Coaſts in ſome Places, make by this Shell Manure is ſo great, that I hope nothing is wanting to tempt all thoſe who are within the Reach of it, to uſe it. I have ſeen this as well as the other Benefits offer'd by Nature, neglected ſo often, that I think too much cannot be ſaid to ſpirit up the Farmer to employ them. Of this I am ſure, more cannot eaſily be ſaid in their Favour than is true.

CHAP. XIX.

Of Parts of Trees and Plants uſed as Manure.

IT has been obſerv'd in a general Way already, that all Vegetable Matter when it rots and decays, becomes a Manure greatly enriching Land, and feeding the Crop that is ſown upon it. In this Chapter I ſhall for the farther Aſſiſtance of the practical Huſbandman, mention the ſeveral Particulars which are moſt ready and moſt uſeful in this Kind.

All large Weeds are excellent to mix with Dung in the Yard, or in a Pit, as already mention'd; and the moſt juicy are the beſt. They muſt be cut up before they run to Seed; and the more perfectly they are rotted, the richer they prove, and the readier for the Farmers Purpoſe.

Dead Wood, which is found in ſome Quantity in Foreſts, and is ſo rotten that it will ſnap, and almoſt crumble between the Fingers, is an excellent Manure. The Branches of Trees that lie cover'd with Leaves, and the decay'd Stumps of others that are reduced to a blackiſh Matter, which is light and ſpungy like Touch-wood, which are not uncommon in damp Places, ſhould be collected by the careful Farmer for this Purpoſe.

I have never ſeen theſe uſed alone except in Lincolnshire, where I ſaw a Piece of Corn Land upon the Edge of the Fens, manur'd with decay'd Willow Stumps beat to Pieces with a Beetle: but about Charlton Forest in Sussex, the Farmers buy the rotten Branches of the Trees, as before mention'd, of poor People, who pick them out of the lower Parts of the Foreſt, and mix them with their Dung.

The Sussex Farmers agree, that nothing enriches their Soil ſo much as theſe dead Branches; and I am a Witneſs in the other Inſtance, that rotten Willow Wood alone is a prodigious Improver of Land, for I ſaw the Crop, which was a very fine one, though the Land was naturally but indifferent.

The Farmer ſhould at leiſure Times employ his People in getting together Weeds and decay'd Wood to add to his Dung, if it were only to encreaſe the Quantity; for there is hardly an Article of more Concern to him in all his Buſineſs, than the making up enough of his Manure. But beſide the Advantage of encreaſing the Quantity, theſe Things certainly add to the Richneſs; and that for two Reaſons: as decay'd Vegetables are themſelves a very fine Manure; and as a Mixture of Manures of theſe Kinds always adds to the Strength of both.

The decay'd Leaves of Trees are worth his Regard alſo: they add but little to the Quantity, but they very much enrich the whole.

The Barks of Trees are as ſerviceable for Manure as any other Part, and their Virtue laſts longer. Not only the naturally rotted Bark is excellent for this Purpoſe; but that which has been uſed by Tanners: this gives a very great Fertility, and its Effect will continue ſeveral Years.

Wood that is any Way brought to a State of Decay, will equally anſwer the Farmers Purpoſe. For this Reaſon Saw Duſt is always uſeful; for a little Wet, or a ſhort Effect of the Weather perfectly decays it; and the Effect is more ſpeedy than that of Tanner's Bark; but it is not ſo laſting. Malt Duſt; and Oil Cakes are alſo uſeful in the ſame Way; and when the Farmer can get them, he never ſhould neglect the Opportunity.

It depends upon Accidents whether the Farmer can have theſe laſt mention'd Articles in any Quantity; but whereſoever they fall in his Way, they are a great Benefit, and he knows little of his own Intereſt if he neglects them.

CHAP. XX.

Of Parts of Animals uſed as Manure.

FROM the Parts of Plants we naturally come to thoſe of Animals; all which, as they are of a rich and fertilizing Nature, deſerve the Farmers Regard as Manure. A proper Attention has been ſhewn to ſeveral of theſe of late; and many Things never before thought of, have been introduced as Manures, eſpecially in the Neighbourhood of London.

Indeed the Convenience of having Manures of particular Kinds, is a very great Article: ſome fall in the Way of one, ſome of another; but he who would make the beſt of his Land, muſt have a thorough Knowledge of all the Kinds, that he may take what he can procure: and in this never let him concern himſelf whether the Thing have been ever uſed by his Forefathers, or their Neighbours. For what is good Manure in Kent, is ſure to be the ſame in Somersetshire, or elſewhere, provided it be applied to the ſame Kind of Land.

In particular as he will here ſee a Detail of a great many Parts of Animals, which are in different Places uſed as Manure, let him lay hold of any that he can, though never uſed in that Country before. Nay farther, as he finds ſo many different Parts of Animals are uſed, let him in general be ſenſible that any other may. He may be aſſur'd, that every Thing of the Animal Kind will enrich his Land; and therefore let him freely uſe any that falls in his Way, for whatever it be, he may reſt aſſur'd of Succeſs.

He will find that whether Chance or Judgment directed People at firſt, they do in all Places uſe as Manure ſuch Animal Subſtances as come in their Reach; and let him do the ſame whether any others have done it or no.

Upon the Coaſts of Norway they dreſs their Land with the Refuſe of the Fiſhermens Boats, who cure great Quantities of Cod and Herring for Exportation. In Newfoundland they do the ſame: and in both Places the Succeſs is very great, no one Thing in all the Liſt of Manures being richer. Theſe People have not learn'd of one another: but Accident, or Knowledge of the Nature of Things, has inſtructed both. Let the Farmer who lives in the Way of this Manure, from theſe Inſtances know its Value. Perhaps one of the Advantages of the preſent nobly eſtabliſh'd Herring Fiſhery, may be the enriching ſome of the worſt Lands in theſe Kingdoms by means of this Refuſe.

The Farmer who lives in the Neighbourhood of a large Market Town, may with great Profit traffick with the Butchers, and all other Perſons who can furniſh him with the Refuſe and Offal of Oxen, Sheep, and other Animals; the Blood, Hair, and every other Kind of rejected Matters being rich for his Purpoſe.

Wool-nippings, the Refuſe of Rabbits Skins, call'd Coney Clippings, and the Hair of any Creature whatſoever, are fine Manures.

Theſe laſt named Articles are of that Kind that do not give a very laſting Richneſs, though great for the Time. The Farmers in many Counties, however, know the Value of them ſo well, that though their Virtue is quite ſpent in a couple of Years, they find it worth while to buy them at ſeven, eight, and ſometimes nine Shillings a Buſhel.

The Way of uſing theſe is to ſpread them thinly and evenly over the Ground, at the Rate of about thirty Buſhels to the Acre. The firſt Rains waſh in their Virtue. And the Crop ſufficiently ſhews its Excellency.

Next to the Hair it may be proper to mention the Hoofs of Cattle, and other tough Parts, which may be had as Refuſe. No matter what Creature they belong to, they are all equal in Richneſs.

The old Writers on Huſbandry ſay the Farmer is to uſe only the Hoofs of ſuch Creatures as chew the Cud; but that is an idle Fancy, all Hoofs are of the ſame Efficacy, and the only Difference is, that the thinneſt, and thoſe of the youngeſt Animals enrich the Ground the quickeſt, and the thicker and tougher have the more durable Effect: though they are all very laſting Manures.

The beſt Way of uſing theſe is to ſpread them upon the Land, ſome time before plowing, that the Weather may diſpoſe them to part with their rich Parts; they are then to be plowed in, and the Land will have the Advantage of them fifteen or twenty Years.

Theſe Manures agree with all Sorts of Soils.

The Horns of Cattle are too tough and cumberſome to be laid upon the Land, in their natural Condition, but they have the ſame enriching Quality. Shavings of them are to be had at the Horners and Lanthorn-makers in London, and theſe are ſo thin that the Weather is able to affect them. The Hertfordshire Farmers are well enough acquainted with the Value of theſe Shavings, and where to get them. Though they pay a large Price for them, they go a great Way and laſt a great while, ſo that it anſwers very well.

The Way of uſing theſe is to ſtrew them thinly and evenly over the Land, and after a Time plow them in; they mellow the Earth gradually, and encreaſe the Produce in a Manner that is ſurpriſing.

CHAP. XXI.

Of Dung in general, as a Manure.

HAVING, in the laſt Chapter, treated of the Parts of Animals, as they may be made uſeful in the Improvement of Land; we naturally come next to their Excrements, or Dung; which furniſhes the great ſtanding Article of Manure throughout the Kingdom.

However ſenſible the Farmer may be of the general Uſe of Dung already, there is a great deal to be ſaid of the particular Kinds; and their diſtinct

distinct and separate Uses: for there is as much Difference between one Dung and another, as between Chalk and Marle, or many others of those already mentioned: and there requires as nice a Judgment in suiting the Kind to the Soil; and in the proper Time and Manner of using it, as in any Branch of Husbandry.

The Dung of different Creatures, though it be all rich and valuable to the Farmer, yet is rich in different Degrees; and suited, according to its Kinds, to different Purposes. I shall endeavour to inform the Farmer thoroughly in this Article of his Profession, under its distinct Heads. But first, it may not be amiss to give him some general Notion of the Nature of this capital Manure, and the Manner wherein it enriches or operates upon the Land.

And first, the very Purpose of all plowing and all manuring of Land, is to divide and break the Body of the Soil, which is, in most Kinds, naturally too compact: for the more the Body of the Soil is broke and divided, the more free Passage the Roots of Plants have; and the more they have the Advantage of it.

In plowing, this breaking and dividing of the Body of the Land, is done altogether by Labour; but in the Use of Dung it is done by a Kind of Fermentation. We know that all Dung is naturally disposed to ferment; and we are sensible also, from Experience, that what is liable to ferment of itself, will ferment and work up a large Quantity of any proper Matter among which it is mixed.

We see a little Yeast ferment a great deal of Dough; puffing it up and rendering it lighter: and in the same Manner Dung works up and loosens the Ground. This is what makes the Soil mellow; and this is the natural and real Use of Dung; and the Way in which it makes Land fruitful.

We see an Instance already recited, of the Way in which the Use of Shells mellows the Soil; making it sometimes so loose and crumbly, that it has not Body enough to hold the Roots of the Grain. The same is the Effect of Dung, only more moderate; as we commonly use it: Experience having, in general, guided Men pretty well in the Quantity, though not sufficiently in the Choice.

We may perceive this is the true Use of Dung by this, that Plants of all Kinds grow much better upon Land that has been dung'd; than they will upon an Heap of the Dung itself. So that it is plain the Dung does not directly nourish the Crop itself, but it makes the Earth more fit to nourish it. This is done by breaking and dividing the Earth, and no otherwise.

This may set the Farmer right in one essential Article; that is, the Manner wherein he is to dung his light Soils: of this I shall speak particularly hereafter, but in general, pure Dung, laid upon a sandy Soil has no Effect, because dividing the Soil is not what is there required. The little Stones of which Sand is composed, are not join'd together; and Dung has not the Power of breaking or dividing each separate Grain.

Even in the Gardener's Grounds about LONDON, where they force their Herbs to grow, in a Manner, in Dung, we see the bad Effect it has on them. A Gardiner's Turnep has not half the Sweetness of a Field Turnep: and it is well known that the Water which has boil'd one of these Dung Cabbages stinks, whereas there is no ill Smell, but rather a musky Sweetness, in that wherein a Cabbage has been boil'd that has grown in a more natural Soil.

The Farmer will never dung his Fields in that abundant Manner, but if he should, even the Corn would have a Taste of it; this suffices to shew, that the true Use of Dung, as said already, is to fit the Earth to afford Nourishment, in the fullest Manner, to a Crop; and not to yield that Nourishment itself.

But beside this natural Effect in breaking and loosening the Soil, there is another very considerable one in all Dung, when properly laid on the Ground; that is, the giving a Warmth to the Land, and cherishing the young Shoot. This is owing to the same Cause, the Fermentation of the Dung, for that is the Occasion of the Heat it has in itself; and which it so freely communicates to every thing about it. This may afford a Hint to the Farmer, as to the Time of laying on his Dung, of which more hereafter.

But as Dung thus naturally renders a Soil warmer than it would otherwise be, it may also make it colder; and it has been observed, that whole Fields of Wheat have perish'd by Frost on dung'd Lands, when they have liv'd through the Winter on those Lands of the same Soil, that have had no Dung that Year. It is possible this may have arisen from the Cause to which it has been attributed, that is, to the Hollowness of the dung'd Ground in which Water lay about the Roots of the young Corn, and then freezing, kill'd it: But more Observations ought to be made before this be received as an universal Fact.

It must be farther observed, that Mr. TULL is the Person who delivers this Account, and his Prejudice to Dung might carry him too far. He wrote to establish the Use of a particular Kind of Tillage instead of Dung, so that he may be considered as a prejudiced Person. I shall add, on this Occasion, an Observation which the Farmer will do well to carry with him on all others. That is, that we are to read what is written by Persons who propose Systems, with great Allowances for Partiality. Well supported Facts may be received, whoever relates them, but Men may have been blinded by their Prejudices, when they argue from single Experiments of their own. I am sorry to see, the few who have meddled with this Subject since Mr. TULL's Book, all take up his violent Prejudices against Dung. They have considered him as an ingenious, but they should also have considered him as a prejudiced Writer.

Some Lands bear Dung better than others; and in the same Manner certain Soils require particular Kinds; or a proportioned Quantity of that Manure. In this Part of his Business it is that the Farmer wants to be instructed, not as to the Nature of Dung itself, which he full well knows; and which I hope he will continue to esteem his own Way, and as his Fathers used to do, in spite of all the Charge of Folly and Obstinacy brought against him by partial Writers; who, while they accuse

accuſe him of Ignorance, often know much leſs than himſelf.

Let him continue to eſteem Dung the readieſt and moſt univerſal of all Manures, for ſuch it certainly is: and in order to uſe it to the fulleſt Advantage, let him obſerve the Cautions and Directions that will be here laid before him. He may then tell theſe Enemies to Dung, that all the Accidents they lay to the Charge of that Manure, are owing either to a wrong Choice of the Kind, to a wrong Proportion of it to the Land, or a wrong Management of it in preſerving or laying it on. And theſe are the Errors againſt which I ſhall attempt to guard him, by what I have ſeen in my own and others Experience.

To ſay Dung often does Miſchief is to ſay true, but then it is in unſkilful Hands: but to rail at Dung as always hurtful, were to fly in the Face of all Authority, and all Fact; and to reaſon againſt Experience.

I am ſorry to acknowledge this has lately been done by too many, but they are all blameable for it: they have all done it in Favour of ſome other Manures, or of ſome particular Kind of Tillage. This is to write partially. I have already given a very full Account of many, and ſhall, in the ſucceeding Chapters, of all the other Manures; and the ſame of every Kind of Tillage; but doing them Juſtice, let us do Juſtice alſo to this. The preſent Faſhion of railing at this Manure is enough to miſlead half our Farmers.

It is certain that all Soils do not equally require, nor will all equally bear Dung. This Reaſon dictates, and this Experience affirms. For Inſtance, if the Effect of Dung be to divide and to warm the Soil, Reaſon will affirm that it is not ſo needful on thoſe Soils, which are hot and looſe already, as on thoſe which are cold and compact, or tough. And Experience confirms Reaſon; for ſpeaking in general, Dung is not ſo uſeful on ſandy as on clayey Lands.

In the ſame Manner all Times are not proper for the laying it on, nor is every Condition of this Manure proper for every Occaſion. For if Dung be left, when rotten, upon the Surface of the Ground, the Sun and Rains will exhauſt all its Virtue: and, in the ſame Manner, if it be bury'd too freſh, and in too large a Quantity in rich Soils, it will occaſion Weeds.

All this is true; and from this have ariſen the general Complaints and Cautions againſt Dung. But as that Manure is uſeful, in the higheſt Degree, I ſhall, inſtead of condemning it in general, for the ſake of theſe particular Miſtakes which may happen in the Uſe of it, ſhew the Occaſion of thoſe Accidents which ſometimes attend it. I ſhall point out to the practical Farmer, the Soils to which the ſeveral Kinds of Dung are fitted; and the Manner of preſerving, and the Seaſons of applying them: by this Means teaching him how to prepare his Manure for his Soil, that he may reap its Benefit, and eſcape the Misfortunes others ſuffer from its ill Management.

Having thus led the practical Huſbandman through a general Conſideration of Dung, as a Manure, I ſhall treat ſeparately of the particular Kinds.

CHAP. XXII.

Of Horſe Dung.

HORSE Dung, though the Name expreſs but one Thing, may be divided into ſeveral Kinds: and it muſt be ſo in order to give the practical Huſbandman a full Information of the Uſes to which it will ſerve.

The Differences between the Dung of various Animals, which are very great, as will be ſhewn in the ſucceeding Chapters, depend principally upon the Food on which the Creatures live: the Dung of thoſe which feed only on Fleſh being of one Kind, that of thoſe which feed on Herbage only, of another, and that of thoſe Creatures which eat both Kinds, being of a middle Nature between the other two; and ſufficiently different from both. It is natural Dungs ſhould thus differ, becauſe the Office of Digeſtion is of the ſame Kind in all Creatures: ſo that the Matter digeſted muſt make the Difference.

Now tho' Horſes feed altogether on Herbage and Vegetable Products, yet there is a great deal of Difference between the green and moiſt Graſs they eat on Paſtures, and the dry Hay in the Stable. The Corn alſo is another great Article in the making of his Dung: but this is not all the Difference. If we ſpoke only of the Dung pure, and as it is voided, we ſhould eaſily conceive there muſt be theſe Variations; but we generally mean by Horſe Dung, that which is mix'd with the Straw or Litter; and we are alſo to conſider it as it may accidentally have other Mixtures.

To come to a perfect Knowledge of this Manure, we are to conſider it then in three Conditions. As pick'd up pure and entire; as taken out of Stables, and as ſwept and ſhovelled up from the Roads; which laſt, though not a common, is an excellent Practice. In theſe three States we find the Dung pure, mix'd with Straw and Urine, or mix'd with Urine and Duſt.

Theſe ſingle Circumſtances make a great Difference; but a great deal more is alſo made by the Time when it is uſed, whether that be while it is freſh, or after it has been drop'd, or lain mix'd ſome Time.

To give the Farmer a general Notion of this Difference, pure Dung is moderately warm; Dung from the Stable, when it has got into a Ferment with the Straw and Urine, is hotteſt of all; and the dry Dung of Roads, though it has little Heat, has yet a great deal of Fertility.

There is alſo a vaſt Difference between the Dung of the Stable, (which is the moſt commonly employ'd) when it is in a State of Fermentation, and when it has gone through that, and is well rotted. In the firſt Condition it is often too rank, and leſs than the uſual Quantity ſhould be given when it is taken at that Time; but when mellow, it has ſufficient Fertility. Of all theſe Accidents and Conſiderations, we hope to give the Reader the Means of judging fully: and we are aſſur'd that when the ſeveral Conditions of this Manure are better

underſtood, and more regarded, there will be few Complaints of its ill Qualities.

The Phyſicians when they order Horſe Dung as a Medicine, always particularly direct that of Stone Horſes to be uſed. They have Reaſon for what they do; and the Farmer will have the ſame Reaſon for giving the like Preference in his Uſes of it as Manure.

It is not only that Stone Horſes are uſually more vigorous and ſpirited than Mares or Geldings, that makes their Dung preferable: but in general there is a Difference in the feeding; the Stone Horſe being moſt commonly kept up to dry Meat in Stables.

The Dung of any Animal conſiſts of the groſſer Parts of its Food, mix'd with the Juices of the Mouth, and Stomach, and the Gall. It is therefore a Mixture of well ground Vegetable Matter, and Animal Juice, which muſt make it very rich. And it is plain from this, that the ſtronger and heartier the Food, the better and richer will be the Dung.

Therefore the richeſt Horſe Dung is that of Stable-kept Horſes, well fed with Hay and Corn; and this gets great additional Richneſs from the Urine, which in a well-contriv'd Stable mixes among it. The Stable for this Purpoſe ſhould be well paved, that the Moiſture may not ſoak into the Ground, but mix with the Dung and Litter.

It will be found upon a critical Enquiry, that every Thing the Farmer ſees in the Nature and Effects of Dung, agrees with and ſupports this Account. The Dung of Cows is colder than that of Horſes, becauſe Cows in general feed on Graſs: that of Horſes is warmer becauſe of their Hay and Corn, and the Dung of Fowls is the warmeſt of all, becauſe they feed in a manner on Corn only.

For this Reaſon Horſe Dung is fitteſt for cold Lands, and Cow Dung for hot: and in the ſame Manner, Experience will always confirm right Reaſoning.

The Dung of our own Species is by many extolled beyond all other; and doubtleſs it exceeds all in Strength and Richneſs, becauſe of the Fleſh we eat: and Swine's Dung is alſo extreamly rich, becauſe of the Animal Part of their Food; they eating partly one Kind, and partly another, as it is offer'd to them.

Notwithſtanding that it has been ſo much a Faſhion of late to rail at Horſe Dung, all own that it has great Effects. The old Writers attribute the Fertility it gives to Lands, to its being of a Nature fit to attract the Nitre of the Air: and Mr. Tull attributes it altogether to its Fermentation, which breaks and divides the Ground: and this Fermentation he ſays is owing to the Salts with which it abounds.

Mr. Tull's ſeems the plaineſt Account; but perhaps there is Truth in both. Whatever be the ſecret Cauſe of the Operation of Dung in making Land fruitful, for a Secret it is yet, notwithſtanding all that has been written about it, it is plain from all Accounts, as well as from Experience, that it has ſuch an Effect; and it will become the Farmer to know exactly in what Manner to regulate it to his Occaſions. To this I hope he will be led reaſonably, by what has been here written of Horſe Dung, which is the Kind that is commonly underſtood by the Word Dung, when uſed generally; and by what has been written of that Manure in general in the preceding Chapter: ſo that after ſuch Preparation, we may advance to the Manner of treating and uſing this Manure.

Horſe Dung may be too poor from its having too much Litter among it; and from its having lain expos'd too long to the Sun and Air. In this Caſe a great Quantity of it is required to anſwer any Purpoſe; and the beſt Way is not to uſe it alone, but to mix it with other Dung, where it may get into a new Fermentation.

It may alſo be too rich, as when the Litter is well proportion'd, the Urine all ſoaked into it, and the Fermentation high. In this Caſe it will occaſion Weeds and Inſects wherever it is laid; it ſhould therefore be tempered with a proper Quantity of Earth well mix'd among it before it is ſpread. This at once encreaſes the Bulk, which is a material Article, and takes off its Rankneſs.

From what I have ſeen in my own Experience, I prefer the mixing of Earths with Dung upon every Occaſion, to the common Method of laying the Dung on alone. I am ſure every Farmer will find the Advantage who will try.

But in this let him take Care to ſuit the Earth he mixes with his Dung, to the Land on which it is to be laid. I have already ſhewn, that one Soil may always be a Manure to another. Let the Huſbandman keep that in his Mind; or turn back to thoſe Pages. He will there find, that if it be a ſandy Soil on which his Dung is to be laid, a clayey Earth is beſt for him to mix with it; and if it be a clayey Soil, a ſandy Earth, and ſo of the reſt. Carefully minding this, he will at the ſame Time, by mixing Earth with his Dung double or treble the Quantity of his Manure, take off the Rankneſs of the Dung, and give a double Dreſſing to the Land; the earthy Part of which will remain in great Effect, long after the Dung has ſpent itſelf.

I know that the common Method is to adviſe the Farmer to mix Waſh, Weeds, and many other Things with his Horſe Dung in the Heap; and to add Earth to Sheep Dung, by laying it under them in the Hovel; as will be obſerved hereafter. But I am for extending the Practice of mixing Earths to both Kinds, for I have found it as uſeful with one as with the other.

Dung in itſelf is too rich for any Soil. I believe Mr. Tull is right in attributing the great Advantage that ariſes from the Uſe of it to its fermenting with the Soil; and I have found by Experience what is very natural to conclude from Reaſon, that it will ſpread this Fermentation farther, by beginning with a little Earth firſt. The Soil that is already mix'd with the Dung, gets into a State of Fermentation before it is laid upon the Ground; and as ſoon as it is plow'd in, that works upon the reſt.

A great deal is to be conſider'd in the keeping and preparing, as well as applying of Horſe Dung. As to the three Kinds already diſtinguiſh'd, the Farmer will find the moſt frequent Uſe for the Stable Dung, or that mix'd with

Litter and Urine. For the others, the Uſe of pure or entire Horſe Dung muſt be on Grounds that require but moderate heating, with the Addition of their Fertility. The Road Dung is to be uſed where Fertility is wanting, and not Heat; for of the latter it has very little.

CHAP. XXIII.

Of Horſe Dung uſed ſingly.

THE Uſe of pure Horſe Dung is in a Manner confined to Paſture Grounds; and that of the Roads to Corn Lands of a clayey Soil. On theſe two Heads I have ſome Things to add from my own Practice, which I hope will be the more agreeable to the practical Huſbandman, as they have not been enough regarded by others.

In the firſt Place, as to entire or pure Horſe Dung, I one Year made my Man take up all the Dung they drop'd as they went along, and lay it up in a Place under Cover. When a large Heap of this was collected, I had it crumbled to Pieces, and ſtrew'd thin over my Meadow and Paſture Grounds, in the fair Hours of a driping Spring; the Rain waſh'd it in, and the Encreaſe and Richneſs of the Graſs was ſurprizing.

The next Experiment I made with it was, by ſtrewing a large Quantity of it over a Field of Corn, in the Manner the Farmers call ſowing of Dung, and as they uſe Pigeons Dung in many Places: but I muſt own this did not at all anſwer my Expectations. I apprehend that its light and dry Nature, where it lay expos'd upon a naked Field, made it loſe all its Virtue without entering the Soil. But I ſet down both the Experiments juſt as they are: that the Farmer may know what it will not do, as well as what it will.

Now as to Horſe Dung taken from Roads, I have experienced that two Ways, and ſhall in the ſame Manner relate the different Effects. I have a Field not far from a Place in the great Road, where the Horſes ſtand to ſtale, and they drop their Dung often in the ſame Place. I have got the Shovelings of this Part of the Highway for my Field two Ways; and the one it was prejudicial, the other very advantageous.

Firſt of all I had it taken up at a dry Time, when it was almoſt all like Duſt. This taſted ſaltiſh, and I could perceive it was a gritty Powder, with a great deal of dry Dung among it, and ſome remain of the Urine. The Land I laid it on was a cold clayey Soil, and it anſwer'd in great Perfection. The Grit breaking the Clay, at the ſame Time that the Remains of the Dung, and the Salt of the Urine, warm'd and enrich'd it. At another Time I had it taken up when it was rediſh colour'd, and as ſoft as Pudding. It was ſpread directly over my Land, which was plow'd in upon it, and Rains coming on, the whole Virtue was kept in, and waſh'd into the Soil: but this did great Harm to my Crop, being too ſtrong of the Urine. Many Things aſſiſt the Growth of Plants in a moderate Way, but will deſtroy them in too great a Quantity. From that Time I have kept to the Uſe of the Road Dung tolerably dry, and have always found great Advantage from it. And I have kept my Heaps of pure Dung for my Paſture, moiſten'd by having the Chamber Pots emptied upon them; and I have found this anſwer to my own great Satisfaction, and the Surprize of all the Neighbours.

CHAP. XXIV.

Of Horſe Dung made into Compoſt.

HAVING now done with theſe two Conditions of Horſe Dung, I come to ſpeak of it practically, in the Way wherein it is ordinarily uſed; that is, as mix'd with Litter and Urine: and indeed the more Ingredients are for this Purpoſe mix'd with it, the better. The antient Writers on Huſbandry have laid down a Plan for the improving Horſe Dung this Manner, which the lateſt have very prudently copied from them.

The Benefit of Dung in the uſual Way, is not owing to the Richneſs of the Excrement of the Horſe alone, but to its State of Ferment with Straw and Urine. Now this Ferment, and this Richneſs, may be both encreas'd: nor is there any one Article in all the Farmer's Practice, that is more neceſſary to be thoroughly conſider'd.

The Virtue of Dung may be improved, and preſerved: to both theſe Things the Farmer is to attend. It will be improved by mixing with it all Kinds of Things that have an Animal Tincture, or Vegetable Matter that will rot with it, or that contain any Salt; and it will be preſerv'd by keeping it cover'd.

Markham very properly adviſes the Farmer to pour continually upon his Heap of Dung, all his Beef Broth, Brine, Soap Suds, and the like; by which Means, he ſays, truly, one Load will be worth five; and in general theſe Writers condemn with Juſtice, the naked and expoſed Manner wherein the Dung is kept; by which Means the beſt Part of its Virtue is loſt before it is carried to the Ground.

On theſe Principles the intelligent Farmer will readily follow the prudent and common Advice to keep his Dung cover'd, and to add to it every Thing he can, which will in general give new Virtue, as well as encreaſe the Quantity. I hope to ſhew him how to uſe Dung to twenty Times the common Advantage; and to avoid all the Miſchiefs that frequently happen from its improper Uſe.

Firſt, for the preparing of it according to theſe Principles, let him dig a Pit of Depth and Bigneſs proportion'd to his Quantity of Soil. This muſt be well paved, and wrought up the Sides, that no Moiſture can get through, and arched over at the Top to keep all cloſe; with a Door for taking out and throwing in the Dung. The draining of the Stable and Cow-houſe ſhould run into this Pit, and into it all the Dung and Litter from the Stable is to be thrown; and the Bottom of the Stable and Cow-houſes paved hard, that the Urine may not ſoak

in,

in, but run through the proper Channels into the Pit; and if the Chamber Pots be daily empty'd into it, ſo much the better.

Beſide the Horſe Dung, all the Cow Dung, Hog Dung, and that of all other Kinds, if not enough to be ſav'd alone, or not wanted alone, is to be thrown into this Pit; and all the Refuſe of the Garden, Cabbage Stalks, and the like; and the Aſhes from the Kitchen; the Earth cut up in cleaning of Ditches, and the like: and into it ſhould alſo be emptied, the Waſh, Soap Suds, and all other Refuſe. The whole is to be kept of ſuch a Degree of Moiſtneſs, as to aſſiſt in the Fermentation, and no more: and thus every Thing will be made uſeful. The whole Spirit of the ſeveral Materials will be kept in, and the Mixture will be mellow'd in a ſurprizing Manner.

Old MARKHAM who laid the Plan of mixing theſe Matters with Dung, ſays, one Load will be equal to five; later Writers ſay, one will be equal to twenty, but the Farmer muſt take Care how he depends too much upon theſe large Promiſes.

I ſhall propoſe to the Farmer upon the foregoing Principles, an Addition to this, which will be of more worth than all. When he has got his Quantity of Dung thus rotted and mellowed, let him throw in at leaſt three Times its full Quantity of Earth. Thus the whole is made four Times what it was, and every Load will be as good as a Load of the entire Mixture. Let him not ſpare the Expence or Trouble of mixing the Earth well with the reſt: when that is done, let it lie together about a Week, in which Time it will ferment and mellow, and will then be fit to lay upon his Land to the greateſt poſſible Advantage.

I will not ſay this Compoſt is not ſubject to breed Worms, for all rich and mellow Soils will have them; but it will breed fewer Weeds than any.

CHAP. XXV.

Of the laying on of Dung.

NOW whether it be this, or any other Kind of Dung that is uſed, there is a great deal of Benefit, or Loſs, from the Time and Manner of laying it on the Ground. Some, beſide expoſing it to the Weather while in the Heap, let it be ſpread out upon their Lands a Month or two before it is plow'd in: but this is a great Error; for by this Management, the Sun and Air exhauſt almoſt all its Virtue, before it gets into the Ground; ſo that a large Quantity has very little Effect.

Others lay it on in little Heaps, and let it remain ſo a good while before they ſpread it. This is not ſo weak a Practice as the other; but it is throwing away a vaſt deal of the beſt Part of the Virtue.

In Land that has three Plowings for a Corn Crop, the Time of laying on the Dung is juſt before the ſecond Plowing: and in the Way I have advis'd, let it be carried from the Pit after ſix or eight Days mellowing with the Earth: and let it be ſpread as ſoon as it is laid on; and plow'd in as ſoon as it is ſpread. This is the Way to preſerve all its Virtue; and when manag'd this Way, it is amazing to ſee what Effect it takes upon the Soil. And the Farmer will hence know how to uſe it on all plow'd Lands.

When it is for Paſture Grounds, another Method is required. To the Mixture of the Dung and Earth, let there be added an equal Quantity of River Mud; and let a Heap of this be cover'd with freſh Turf, that it may ſweat and mellow together. When it is thoroughly mix'd and ſhort, it is to be ſpread thin on the Grounds before Rains, and it will all diſſolve, and be carried in to the Soil in ſuch a Manner, that only a few Straws ſhall remain.

Theſe are the general Rules for the Management of Horſe Dung, whether uſed of itſelf, or made the Foundation of a Compoſt: but general Rules cannot ſuit all Particulars; and that Advice which is uſeful to one Farmer may be injurious to another, unleſs proper Cautions be added.

Thus if the Farmer who uſes Horſe Dung in the common Way, fears Weeds; let him lay it on his Ground when a little cooled. If he want its utmoſt Warmth and Strength, he is to uſe it freſh, and in all its Vigour; and in this Manner his own Prudence will adviſe him on a great Variety of Occaſions, remembering the general Directions.

When Dung is to be laid upon a Summer's Fallow, the proper Time is juſt before the twy Fallow, ſpreading it juſt before the Plowing, that it may be cover'd in, and be buried to mellow the Ground about it till the twy fallowing, when it will be rais'd again, and mix'd by this Care in a due Proportion. The great Misfortune attending the Uſe of Dung is, that it affects only a ſmall Part of the Soil; but this Practice is a Remedy for that, twice the Quantity at leaſt of the Land falling under its Influence, in this Method of uſing it.

CHAP. XXVI.

Of the Virtue and Quantity of Horſe Dung.

WHEN the Farmer who has been us'd to fill up his Field with Weeds by his dunging it, lets that Manure lie till it be rotten before he lays it on, he avoids that Miſchief: but at the ſame Time he loſes a great Part of the Virtue of his Dung. However, the Land that is ſo ready to be over-run with Weeds is rich, and therefore requires the leſs Aſſiſtance: ſo upon the whole this will do. Thus the conſiderate Man is to take a View of the Matter before he judges any Thing.

There is another Fault in Dung which the Farmers in general are leſs aware of, though it happens in the ſame Kind of Lands. When Dung is improperly laid on a rich Soil, it not only promotes the Growth of Weeds, but it makes the Corn itſelf rank in the Stalk, and thin in the Ear. Nothing is ſo eaſy as to do

Miſchief

Miſchief with Dung. In this Caſe mellow Dung, uſed in Moderation, is the right Practice. The Farmer ſhould never lay his Dung on this Kind of Land till it is rotted to mould, and then not more than fifteen Load on the Acre.

'Tis for this Reaſon that old, mellow, and rotten Dung is ſo often mentioned in the preceeding Chapters. It is oftener required than freſh, on many Lands. And for want of this Knowledge, the Farmer who follows, as he thinks, the Practice of his Neighbours, without regarding his Soil, often injures his Land by the great Expence of dunging it improperly: and knowing no other Method of aſſiſting it, he has Recourſe to Dung again, and ſo ruins it entirely.

The Expence of Dung is very great; and the Farmer often fooliſhly makes it much greater than it need be. He thinks if Dung be right, why then the more of it the better: but Dung is a Medicine that kills in an over Doſe. Neither is there any Uſe in encreaſing it, when it does not amount to a miſchievous Quantity; for three Crops will exhauſt the Virtue of any Quantity of Dung whatſoever. Twenty Load to an Acre is the full Proportion that ever need be allowed.

There is no Grain with which freſh Dung ſo well agrees as Barley, it is ſo natural to this that it does better pure than with any Mixture, and it does beſt of all upon an Etch Crop. In the ſucceeding Fallow the Dung will be perfectly mix'd with the Soil, and have Time to ferment with it. After this the Land will be fitter for Wheat than by any other Management whatſoever.

CHAP. XXVII.

Of Cow Dung.

THE ſeveral Dungs have their particular Natures, and ſeveral Uſes, the latter depending on the former. As Horſe Dung is the Manure for cold Lands, Cow Dung is the proper Dreſſing for hot Soils, this is the common Doctrine, and there is ſome Foundation for it in Truth: not but that all Dungs are, according to the Senſe of the Word, hot; only the Degree is different. They all act upon the Soil, by fermenting with it; and theſe Fermentations are always attended with Heat. The Chemiſts mention ſome Fermentations in their Liquors, that are attended with Cold; but none of thoſe in the Dung made with the Soil are of that Nature.

In ſpeaking of Horſe Dung I have already explained the Occaſion of Heat and Coldneſs in the Effect of Dung in general. As the higheſt fed Horſes afford the richeſt and warmeſt Dung from their dry Food and Corn; it is natural, by the ſame Rule, that Cow Dung ſhould be cold in Proportion, becauſe the Creature feeds, in general, upon green Paſturage: yet ſtill, as Dung, it has ſome Heat and Virtue.

Under the common Article of Cow Dung, the Farmer includes that of the Ox, and others of the ſame Species.

The beſt Uſe that can be made of this Dung is, the mixing it into a Compoſt with the Horſe Dung and other Refuſe, as before deſcribed. And though it has leſs Effect than almoſt any other Kind when uſed ſingly, yet nothing enriches a Mixture more. Let me acquaint the Farmer with what I have learnt from Experience.

I have ſaid before that, on many Occaſions, Dung which has lain together till it is mellow and rotted, is better than ſuch as is freſh. This gives a more ſlow but more general Fermentation to the Soil, than hot freſh Dung; and at the ſame Time that it feeds the Corn in the Ear, it keeps down its Rankneſs in the Stalk, and prevents Weeds.

This may ſeem ſtrange to the unexperienced Reader: but the practical Huſbandman knows there are Soils which do this naturally; and others may be made to do the ſame by Art. He ſees ſome Lands on which Barley in particular has an Ear almoſt as long as the Stalk; and he may give the ſame Virtue to others.

This he is to do by manuring a tolerably warm Soil with rotten Compoſt, and the beſt Ingredient in this is Cow or Ox Dung. The Way I have practiſed it is this. I have made up an Heap, proportioned to the Bigneſs of the Field, of Horſe Dung, Cow Dung, and River Mud; laying them in Layers one over another; a Layer of Horſe Dung, then of Mud, then of Cow Dung, then a Layer of Mud, and then of Horſe Dung again, and ſo on. This Heap I cover with freſh cut Turf, and leave it in that Manner to mellow and rot together. When they are thoroughly rotted I mix all well by frequent turning, and then ſpread it over the Land juſt before plowing, that it may be cover'd in, and yield all its Richneſs.

I have met with very few who know the real Value of Cow Dung, and that becauſe its Nature is not thoroughly underſtood. It has not the ſudden Effect that Horſe Dung has, becauſe it does not ferment ſo briſkly: and therefore it has been ſuſpected of having much leſs than it really poſſeſſes. What Virtue it has alſo very freely evaporates, and is loſt if it be uſed without due Care. So that the Method in which I have found it ſo excellent is, perhaps, the only one whereby its full Virtue can be given to Land.

CHAP. XXVIII.

Of Sheeps Dung.

I COME now to treat of one of the moſt valuable Articles in the whole Claſs of Manures: For the Dung of Sheep is, for many Purpoſes, better than any other whatſoever. It has not that violent Heat which is in Horſe Dung, from the high Feeding of the Creature; but there is a Richneſs in it that exceeds almoſt any other.

Sheeps Dung is not to be managed as Horſe Dung is, becauſe of the Smallneſs; but the Farmers have two Ways of uſing it very familiar, and very advantageous: and theſe are employ'd according to the different Occaſions. The one is folding them upon the Land; the other by ſaving the Dung, together with the Urine, under a cover'd Fold. The former is the more ready and the more common Method, but the latter is by much the moſt advantageous: and is what many have laboured very wiſely to encourage.

But beſide the Uſe that is made of Sheeps Dung theſe two Ways, a great deal is loſt, which might be ſaved to great Profit. When the Sheep are fed on Downs they drop their Dung about, and it does very little Service to that Soil. The wiſe Huſbandman may have great Quantities of this daily pick'd up, at very little Charge; and he will find it more valuable than ordinary Dung, by many Degrees. This I mention as a Hint to the induſtrious and prudent, and ſhall now proceed to the two Methods by which Sheep are made to yield their profitable Manure to moſt Advantage.

The Method of folding them upon Lands is ſufficiently known, and when there is a good Flock, well managed this Way, the Advantage is very great. But here let me adviſe the Farmer to take Care, that their Dung be not left expoſed to the Air and Sun, upon the Surface of the Ground, for that will exhauſt its Richneſs with no Value to the Land. The Dung ſhould be plowed in as ſoon as poſſible: for it is, of all Dungs, the moſt free to loſe its Virtue: and I will maintain it, from what I have ſeen, that ſuch Earth as is plowed up immediately after the Fold, while the Dung is yet freſh, and the Earth is moiſt with their Urine, will have ten Times the Benefit of that where the Folly and Careleſneſs of the Farmer leaves it any Time expoſed.

The Richneſs of this Manure depends, in a great Meaſure, upon the Mixture of the Sheeps Urine with the Dung; and this is evaporated preſently by the Sun, if the Earth be not plowed up to mix and bury ſuch Part as is moiſtened by it: and in hot Seaſons the Dung itſelf will, on a little Expoſure to the Sun, be rendered dry, and of very little Value.

The Dungs, in general, ſuit all Kinds of Soils; but a cold Clay is what receives moſt Benefit from the Folding of Sheep. When the Dung is ſaved in the cover'd Fold, of which I ſhall next treat, the Mixture being what the Farmer pleaſes, he may, at his Diſcretion, ſuit it to all Lands, and there is no Soil whatever whereon it will not be uſeful.

This Method of the cover'd Fold has been ſo long propoſed, that it is a Wonder it has not come more generally into uſe. It is familiar, cheap, and eaſy: It yields a vaſt Quantity of Manure, which is a great Conſideration: and the Farmer, as already obſerved, ſuits this to his ſeveral Purpoſes at Pleaſure: the Advantage therefore is univerſal.

The Method of preparing this is delivered by all the old Writers on Huſbandry, and 'tis ſurpriſing that it is not as univerſally practiſed as it is adviſed, for not one of the new ones but has recited it. Our firſt Promoters of it learned it from Flanders, where it is ſtill practiſed to the greateſt Advantage; nor is there any thing that more accuſes the Farmers of our Country in general of Backwardneſs in Improvements, than their Neglect of this excellent Method.

Mr. Blith recommends Sand to be uſed for receiving the Dung and Urine of Sheep in the cover'd Fold; and others have mentioned other particular Kinds of Earth, but any Kind will receive the Enrichment; and therefore the Farmer is to ſuit that to the Purpoſe for which he wants it, uſing Sand, poor Earth, Loam, or whatſoever elſe will beſt agree with his Land, according to the Directions already given on that Head.

The Manner of doing it is this. Let a large Sheep Houſe be built of a long ſquare Shape, boarded at the Sides, thatch'd at the Top, and open at one End. Let there be Cribs put all round it, for fothering the Sheep when neceſſary; and a Crib may be alſo placed in the Middle. Let the Floor of this Sheep Houſe be cover'd a Foot and a half deep, with a ſandy, loamy, or other Earth, according to the Nature of the Land which is to have the Manure, and let the Sheep ſtand to feed, and lie on it.

At a Week's End let a freſh Quantity of Earth, of the ſame Kind with the firſt, be brought in: and the Dung the Sheep have made, cover'd with it: and let this be repeated every Week, each Covering of new Earth being ſpread to the Depth of three or four Inches. The Sheep will thus lie higher and higher every Week, and all the Earth that thus makes their Bed, or the Floor of the Sheep Houſe, will be mellowed and enriched with their Dung, Urine, and the Fatneſs and Perſpiration of their Bodies; in ſuch Manner that the whole will be one of the richeſt Manures the Art of the Farmer can poſſibly procure.

A Part of it may be taken away from Time to Time, as it is wanted, and freſh Earth laid in its Place, ſo that there will be a continual Supply.

This Method may be uſed for the folding of Sheep all the Winter, that are folded open on the Lands in Summer: and thoſe Sheep that are kept on the Downs may be houſed at Nights all the Year round, in the ſame Manner. The Quantity of Manure thus made is vaſtly great; and the Expence almoſt nothing. And we are to add this farther Conſideration, that as ſandy Soils are a Manure for thoſe which are clayey, and ſo of the reſt, the Farmer will all the while that he is enriching them with Dung, be breaking or giving them a Body, or altering them in whatever other neceſſary Way their Kind requires, with the oppoſite-natured Soil, which is carried on with the Dung; and which will never be ſo well mixed with thoſe Lands any other Way. A Courſe of Years manuring the worſt Soil in the World, in this Manner, will thoroughly alter its Nature, ſo that it never can relapſe into its original Barrenneſs again, and the Farmer will be gathering great Crops all the while.

Even the barren Downs may be, in Time, brought to good Land, by the Continuance of ſuch a Practice: and it is no unreaſonable Expectation that a late Author forms, of ſeeing ſuch an Improvement take Place, if the People concern'd can be prevailed with to have theſe cover'd Folds on their Sheep Walks, and to take the Manure as it riſes, for the Improvement of encloſed Pieces of the Land.

CHAP. XXIX.

Of Hogs Dung.

HOGS Dung has been condemned by ſome of the antient Writers; who have been follow'd in their Cenſure by ſome among the later; as unfit for Corn Lands: but the very Nature of that Cenſure will ſhew the reaſonable Huſbandman, that the Manure to which it was applied, deſerved Praiſe. The Fault they attributed to Hogs Dung was, that it produced Weeds. We know that whatever forwards the Growth of one Plant, will promote that of another: and it is our Purpoſe to oppoſe Reaſon and Truth, to Prejudice and Error.

The whole Fact is, that Hogs Dung is a very rich Manure. Any good Dreſſing will forward the Growth of Weeds, if it be laid on in too large a Quantity. Hogs Dung, as it is the Excrement of a Creature that feeds partly on Animal, and partly on Vegetable Food, is, according to the Principles before laid down, richer than that of any Creature can be which feeds on Vegetables only. This Richneſs was underſtood by the antient Huſbandmen as a Fault. Experience ſhews, that one Load of Hogs Dung will go as far as two of the beſt Horſe Dung. The antient Farmers who did not know this, laid it on in the ſame Quantity they did the other, and then condemned it for the Effects of its great Richneſs, becauſe they had not the right Management.

Any Dung will forward the Growth of Weeds when laid too thick; and they always laid Hog's Dung too thick, becauſe they did not know its Virtue.

The Mixture of Hogs Dung and Urine, as before obſerv'd, heightens the Virtue of common Dung extreamly: and this is a very good Way of uſing it; indeed for Corn Lands no Way is better: for it does not mellow ſo well in the Earth, when laid in a Heap, as Horſe Dung does; and it is ſo rich, there is no ſpreading it thin enough ſingly.

But though it cannot be conveniently uſed alone for Corn Lands, there are other Purpoſes for which it ſerves excellently in its entire State: and among theſe I ſhall name one by which it is ſaid to prepare Ground for Corn better than any other Method.

Hogs Dung uſed entire and alone, is excellent on Meadow and Paſture Ground, producing a large, and at the ſame Time a ſweet Blade.

It is alſo preferable to any other Dung whatever for Trees. It has been obſerv'd of old, that Pigeons Dung was the beſt of all others for the Culture of Fig Trees; but I have try'd it with Hogs Dung in a fair Compariſon: and I have found that the Pigeons Dung is uſeful for other Trees as well as the Fig; but that the Hogs Dung is preferable to it both for that, and all other Kinds.

No Dung yields its Virtue ſo readily as Hogs Dung: but then none loſes it ſo quickly by an improper Management. The Time of laying it on ſhould be carefully regarded; for a gentle Rain coming on, will entirely waſh it into the Ground in a few Hours; and, on the other hand, a dry windy Day will carry away all its Efficacy, and the Land will be no better than if it had been ſprinkled with ſo much Chaff.

The Farmer who chuſes to uſe Hogs Dung on his Corn Lands, muſt remember not to ſpread it in a dry Seaſon; and not to lay on too much. He will do well to make it up with other Matters, and ſo at once encreaſe its Quantity, and render it more convenient for Uſe in the Field. This is to be done in this Manner.

Let the Hogſtyes be well paved, that nothing can ſoak into the Ground, but the Dung and Urine together may mix with whatever is thrown in. Then let all the Refuſe of the Garden, Bean Stalks, Peaſe and Bean Cods, dead Plants, and all other Sorts of waſte Matter, be thrown in, and ſtir'd about from Time to Time, that the Dung and Urine may thoroughly mix with the reſt.

The Hogs will be very well pleas'd with this; and it will raiſe a Quantity of Dung twenty Times as great as naturally would be had from the ſame Number of Swine. This is to be cleared away and uſed as there is Occaſion, throwing in freſh Matter to be mix'd with the Dung and Urine, and converted into Dung in the ſame Manner.

I have obſerv'd that in ſome Parts of Kent, they have imitated the Cuſtom of cloſe folding Sheep, in the Management of their Hogs. They lay the Bottom of the Stye deep with Chalk; and after that has received the Dung and Urine for ſome Time, they dig it up and dreſs their Lands with it to great Benefit; laying in a freſh Pavement to be enrich'd in the ſame Manner for ſome ſucceeding Opportunity.

Earth, Sand, and other Materials, may by the prudent Farmer be in the ſame Manner laid in at the Bottom of his Styes, and dug out once in ten Days or a Fortnight; and the Styes again ſupply'd with freſh. This Earth will be vaſtly enrich'd by the Dung, Urine, and Perſpiration of the Creature, and will make an excellent Dreſſing for Lands. The Quantity alſo will this Way become very conſiderable.

In Staffordshire they underſtand the Value of Hogs Dung ſo well, that they will ſow Lands purpoſely to feed them. There is a particular Kind of Pea they keep for this Service. It is a ſmall white Kind. They ſow the pooreſt Lands with this on Purpoſe for their Hogs, turning them in to fatten; and letting them lie Day and Night upon it. By this they have a ſufficient Advantage from the Swine; and at the ſame Time the Land is ſo enrich'd by their Dung, that it will yield a good Graſs many Years.

This has perhaps given the Hint to a late Author, who has not ſet his Name to his Work, for his Propoſal of ſowing Clover for Hogs. He propoſes the keeping a proper Number of Sows that are ready to Farrow, in Styes made in the Corners, and along the Hedges of a young Clover Field. They are to be fed with boil'd Turnips at firſt, and afterwards with raw ones, rais'd for that Purpoſe, till they have farrow'd, and the Clover is of a Height to feed them.

They are then to be turn'd looſe, where they will thrive in a ſurprizing Manner, grazing without rooting up the Ground.

This Practice, the Author ſays, may be followed upon the ſame Land for three Years with great Profit; and at the End of that Time the Land will be ſo enrich'd by their Dung and Urine, that it will yield vaſt Crops of Corn without any other Dreſſing. It is ſtrongly recommended, but we cannot ſay that we have any where ſeen it try'd, it reſts upon the Faith of the Perſon who propoſed it.

CHAP. XXX.

Of Pigeons Dung.

I Come now to a Dung celebrated by all Writers, and valued by all Huſbandmen with the greateſt Reaſon. 'Tis a Misfortune that it is not to be had in much larger Quantities. I have obſerv'd already, that Swines Dung is better for Trees, and from what I have carefully obſerv'd, I believe that is becauſe the Dung of Pigeons is too hot for that particular Purpoſe. But this, which is a Fault on that one Occaſion, is a great Merit on many others.

This particular Heat which it has in a Degree beyond all other Dungs, makes it ſuperior to them all on cold clayey Soils; on which it promotes the Fullneſs of the Ear in Barley and Wheat in a ſurprizing Manner, while the Stalk and Blade of the Corn are not ſeemingly encreaſed by it. I have ſeen a Field on which the Farmer ventured to beſtow a large Dreſſing of Pigeons Dung, where the Barley ſeem'd half Ear. The Stalk was ſhort, firm and ſtubby, and the Blades ſmall and trifling, but the Head ſurprizing in the greateſt Degree.

It is a very dear Manure where the Farmer is to buy it; but then as a little goes a great Way, it will bear Carriage better than any other Kind, when the Farmer cannot get his Dreſſings on the Spot.

The Farmers in Hertfordshire will give ten pence a Buſhel for it by the Waggon Load, and ſend fifteen or twenty Miles for it into the neighbouring County of Bedfordshire; and notwithſtanding this great Price, it has anſwer'd extreamly well in the End.

Forty Buſhels of Pigeon's Dung will be ſufficient for an Acre of Land, but there is to be a great deal of Care taken in the laying it on. The beſt Way is to ſprinkle it at top of the Ground immediately after the Barley is ſown, for this is the Corn it favours moſt of all. The firſt Rains in this Caſe waſh it entirely into the Ground; and the Corn as it ſwells and ſoftens for ſhooting, takes it up almoſt wholly, and has the Advantage of its Warmth from the beginning.

Sprinkled in the ſame Manner upon the Land juſt after the ſowing of Wheat, it has alſo an excellent Effect. They call this Manner of ſpreading, ſowing of the Dung; it is to be harrow'd in with the Seed, and its Effect begins immediately with the Shoot. It continues viſibly during the whole Growth, to Ripeneſs; for no Corn ſwells in the Ear like that which has had a bad Dreſſing of Pigeons Dung. But this is all. Its whole Virtue is exhauſted by one Crop, ſo that in this Reſpect it falls much ſhort of Horſe Dung, and the common Compoſts, which enrich the Earth very well for three.

Pigeon's Dung is excellent on moiſt as well as tough Soils. The Farmer depends on the Effect of its Warmth, which anſwers equally on theſe two Occaſions; but it is more frequently uſed on the black Clays than any other Land.

When temper'd with other Dung, it is excellent for Trees: and alone it is ſuperior to all other Manures for a Hop Ground. It enlarges the Hop upon the Plant juſt in the ſame Manner as it does the Ear upon the Corn, and gives it a particular Strength and Spirit.

To cloſe this Chapter I ſhall make two Obſervations. The one is, That as the Value of Pigeons Dung is ſo very great, it is extreamly adviſeable for a Farmer to have a Pigeon-houſe wherever it can be done with Conveniency: the other, that I have found by Experience, Pigeons Dung may be encreaſed in Quantity in the ſame Manner as ſome other Kinds, without impairing its Virtue, provided it be done with Prudence and Moderation.

The Method I have follow'd is this. I have cover'd the Bottom of my Pigeon-houſe three or four Inches with a fine mellow black Mould well ground to Powder; and this when it has been taken out, mix'd with the Dung and other Matters from the Pigeons, and the Sweepings of the Walls, has been a Manure of prodigious Virtue.

There are many Reaſons for the Farmer's having his Dovecoat where he can with any Convenience, as will be mention'd in its Place; but this of their Dung eſpecially, when rightly manag'd, and made the moſt of, is not the leaſt conſiderable.

CHAP. XXXI.

Of the Dung of Poultry.

UNDER this Head I ſhall conſider the Dung of Hens, Turkeys, Geeſe, and whatever other Fowls the Farmer keeps about his Yard. If we were to give heed to all the idle Traditions on this Head, each of theſe Kinds of Dung would demand a particular Chapter, for they are ſaid to be of perfectly different Natures: that of the Gooſe being a Poiſon to Graſs, and the Dung of the Peacock burning up Corn.

A better Syſtem however is at this Time eſtabliſhed: Experience has given the Lye to Tradition, in theſe and ſeveral like Articles; and we find by Trial, that the Dung of all theſe Kinds of Poultry is very nearly the ſame, and all very rich.

I have propoſed mixing Pigeons Dung with Earth in a ſmall Quantity, and I ſhall for a double Reaſon recommend the ſame Practice with that of Poultry in general; and particularly with

with Hens Dung. In the firſt Place this is as rich, or nearly ſo, as the Pigeons, and therefore it will bear a ſmall Mixture of Earth as well. Then it is in its Nature ſo tough and clammy, that it cannot be ſpread alone upon the Land ſo regularly as the Pigeons Dung is.

My Cuſtom has therefore been, to have the Dung of my Hens ſtir'd up with about an equal Quantity of fine rich Mould, which divides and breaks it ſo well, that it will freely ſpread like the other, in the Way of ſprinkling or ſowing.

I muſt farther add, that I think, from what I have ſeen, it gives its Virtue better this Way than when uſed alone. For the little Quantity of Earth that is mix'd with it, being already in a Condition of fermenting, ſpreads the Effect very freely through the Land; and ferments the whole, when harrowed in, not only more ſpeedily, but more perfectly than when it is uſed alone.

This is the beſt and moſt profitable Uſe of Hens Dung, and when thus ſown, as they call it, upon Corn Lands, juſt after the ſowing of the Corn, it perfectly well anſwers the Purpoſe of Pigeons Dung, where that cannot be had.

I have known Farmers who, to break the Clammineſs of Hens Dung, mix'd it with Pit Sand, or with Aſhes, and then ſpread it on the Land. This is a Practice recommended in Books; but the mixing it with Mould is much better: for it ferments with the Mould, which I never found it would do with the Aſhes at all, and very little with the Sand.

Hens Dung, properly manag'd, is excellent for Paſture and Meadow Grounds, as well as Corn Lands. I am for the Method of breaking its Clammineſs with Earth, and ſprinkling it by way of ſowing, on this Occaſion alſo; but the Earth I have always uſed, on this Occaſion, is a particular Kind.

I take the Opportunity of the Bottom of ſome old Hay-ſtack for this Purpoſe; the Soil is always mellowed by being ſo long cover'd with the Hay, and a great Quantity of the Seeds are ſure to be mix'd among it. This is the Earth I uſe for mixing with Hens Dung for Paſture Ground, and I give it in a double Quantity.

This Mixture ſpread properly in Spring upon the Grounds, makes them yield a Growth beyond any thing elſe whatever. I have obſerved before, that theſe Bottoms of Hay-ſtacks are of great Value for this Purpoſe: but they are not to be compared to this Mixture with Hens Dung, when uſed any other Way.

Hens Dung, when uſed on Corn Lands, does moſt good of all upon a cold clayey Soil: but it may be uſed on any.

Bad Conſequences have ſometimes ariſen from the Uſe of it, when that has been done without Conſideration; and hence it has fallen, in ſome Places, into Diſrepute: but every thing that can do good, may, in a fooliſh Hand, do harm. Thus ſome ignorant Farmer, taking the Dung from his Hen-houſe, and ſcattering it irregularly on a burning Soil, parched up his Crop; but if he had firſt mixed it with Earth, and then beſtowed it regularly; there is no Soil on which it would not have done Service, though more on ſome than on others.

Hens Dung is not only excellent on Corn and Paſture Grounds, but for Trees. We frequently ſee thoſe Trees on which they rooſt exceed all the others of the ſame Kind and Standing, in the Strength and Bigneſs of their Shoots: and Mr. Worlidge gives an Account, from his own Knowledge, of a Quince-tree on which the Hens rooſted, which, from the Virtue of their Dung drop'd near the Roots, and waſh'd in by the Rains, bore always an incredible Quantity of Fruit.

Peacocks and Turkeys Dung is exactly of the ſame Nature and Virtue with Hens Dung. Theſe ſeveral Kinds ſhould be all gathered up together and mixed with Mould, as I have already mentioned, and they will make a Quantity much greater than might be ſuppoſed, till try'd; and will be of great Value.

The Dung of Geeſe, Ducks, and all other Water Fowls, differs in ſome Degree from that of the Land Kinds already mentioned. The Dung of Ducks is particularly rich, but neither that nor the Gooſes are ſo hot as the Pigeons. I ſpeak from my own often-repeated Experience.

The Dung of Poultry is not ſo much minded by the Farmers, as it ought to be. And that of Geeſe is vulgarly ſuppoſed to be a Cauſe of Barrenneſs, but on the contrary, it is rich in the higheſt Degree. It is excellent on Corn Lands, and may be laid on any Soil.

As it is difficult to ſpread it thin enough it may be mix'd like the others with Mould, with which it will ferment gently, and mellow in a ſurpriſing Manner. After this it will be all waſh'd into the Earth, Mould and all, and will ſtir up a general ſoft Ferment, which breaks the Soil excellently.

I have examined very ſtrictly, and I think all the Effects of Dung may be referred, as before obſerved, to the double Effect of its Fermentation; in dividing and in heating the Ground: and what I have here to add is, that the violent and haſty Fermentations that are occaſioned by the Dung of theſe Fowls uſed alone, and other ſuch Materials, ſoon goes off; and the Earth which was made hollow by it falls cloſe again, before the Crop is half grown; whereas, when they are thus mix'd with Earth, and the Fermentation comes on more gradually, it laſts the longer. I have been led to name this Opinion by what I have ſeen in the Effect of Gooſe Dung mix'd with Mould; and I am confident that the Warmth and Hollowneſs of the Ground, occaſioned by this Manure, has laſted in a Barley Field from the Time it was lain on, which is juſt after the ſowing, to the very ripening of the Corn in the Ear.

One Caution, however, let me give the Farmer on this Occaſion, with reſpect to his rolling, which will hold good univerſally: that is, that he never roll the Ground in wet Weather, for it cakes and clods the Soil, as I have ſeen, and it has prevented the whole Effect of a Gooſe Dung Dreſſing, which was never able to recover the Land to Hollowneſs after ſuch Uſage.

Rolling in dry Weather, on the contrary, at the ſame Time that it ſmooths the Ground, flattening the ſeveral ſmall Clods, burſts and breaks them: and it is now ſufficiently known, that

breaking the Soil is of vaſt Uſe in giving Fertility. Even the beſt Dung, with too little plowing and other Tillage, will anſwer very little Purpoſe; and the worſt in the World, with a great deal of turning, will produce Crops not deſpicable, from the repeated Tillage without Manure.

One Thing more let me add, with regard to Gooſe Dung, before I cloſe this Chapter. The greateſt Difficulty attending it, is the getting it together conveniently, and ſpreading it on the Land. Now I would propoſe to ſome bold Farmer, to take the ſame Method with his Geeſe as with his Sheep, folding them, if I may ſo expreſs myſelf, upon the Land.

To explain this exactly and practically, let him turn in his Geeſe upon his Wheat Field in Winter, and ſuffer them to lie upon it till they have eaten it off cloſe to the Ground, which they will readily enough do, being fond of the young Blade. They will leave in return their Dung very plentifully, and well enough ſpread upon the Land, the Froſts and Rains will ſufficiently break and waſh it in; and his Wheat will riſe, in Spring, not at all the worſe for the Croping, and the Earth will be ſo enriched by that excellent Manure, that the Crop muſt feel the Advantage.

I have never try'd this, or known it try'd. It is propoſed therefore, only as an Experiment worth trying, becauſe the Hope of Succeſs from it is founded on Reaſon. There are alſo in Books many Accounts of accidental Advantages obtain'd from the ſame Cauſe, which are ſufficient to lead a conſiderate Perſon to the Attempt.

The old Notion that Gooſe Dung was deſtructive to Graſs, has been found, by Experience, to be utterly falſe and groundleſs. On the contrary, it is ſeen where ever Gooſe Dung is drop'd in a tolerable Quantity, on a Paſture Ground that has any natural Heart, the Graſs riſes finer, richer, and ſweeter than it does from the Uſe of any Manure whatſoever.

This is Experience, and it is vain to oppoſe againſt it the idle Tales of old Tradition. Of this the Farmer may be aſſured, that Gooſe Dung is as good for Paſture as for Corn Lands; and that if he have Convenience of dreſſing them with this Dung, mix'd with the Bottom of an old Hay-ſtack, as before-mentioned of the other, there is no Manure in the World that will yield him a fairer or fuller Crop.

We learn indeed from Experience in other Countries, as well as our own, where the vaſt Numbers of Water Fowl come in the breeding Time, that their Dung is ſo far from hurting Graſs, or from making it injurious to the Cattle that feed on it, as has been idly imagin'd, that nothing produces ſo rich, or ſo wholeſome Paſturage.

Upon the Coaſt of Norway there are ſeveral little Iſlands, where theſe Water Fowl ſettle in ſuch vaſt Flocks, at the breeding Time, that the very Surface of the Ground is cover'd with them. Their Eggs, and their Feathers, are a Merchandize for the People of the Neighbourhood; but this is not all they get by their Viſits. As ſoon as they are gone, the Earth that had been cover'd with their Dung begins to ſhoot up a Sward, that is not equal'd any where in the World; and they ſend in Cattle to feed upon it, which though Carrion when put there, are, in a very little Time, fatten'd to Aſtoniſhment.

Some of the Scotch Iſlands are yearly viſited in the ſame Manner, by the vaſt Flocks of theſe Birds that come, from none knows whither, to breed there; and the ſame Effect follows, where there is any Depth of Soil. But we are not ſo ready to take Advantage of the Benefits of Nature as our Neighbours; however, on ſome of the like Places in Lancashire, they have the Diſcretion to feed Cattle upon theſe Spots, after they are cover'd with this rich Sward from the Dung of the Fowl; and they find ſo much Profit from it, that 'tis a Wonder the Practice does not extend every where.

CHAP. XXXII.

Of Human Excrement.

THERE is ſomething diſguſtful in the Thought of uſing the Excrements of our own Species for the Dreſſing of Lands, as it is putting them again down our Mouths: but this particular Kind of Dung, is not without its Efficacy; nor muſt we cloſe an Account of Manures of this Kind, without ſaying ſomething of it. There will be no Harm in the Farmers underſtanding its Nature, as to the uſing or not uſing it, that muſt depend upon his Choice.

It has been obſerved already, that the Excrements of all Animals are rich, conſider'd as Manure, according to the Nature of their Food. The higher fed upon the vegetable Kinds, the better; and that the Dung of Fleſh-eating Animals is richeſt of all.

Upon this Account the Excrements of our own Species muſt needs be very rich, as our Food is, in great Part, of the Animal Kind: there is alſo another Reaſon, which is, our drinking fermented Liquors, which never fail to have their Effect afterwards in the fermenting whatſoever they chance to be mix'd among.

The Dung and Urine of all Animals is beſt mix'd together for Manure, and the Spirit that is in the human Urine is well known to the Curious. Chymiſts make a Liquor from it that is as ſharp as Spirit of Hartſhorn.

The famous burning Subſtance which they call Phoſphorus, is alſo made from human Urine; and the Practice of thoſe who have ſucceeded beſt in the making it, ſhews that the Addition of Excrement to the Urine helps the Effect.

I have named thus much to ſhew what vaſt Spirit and Warmth there is in the human Dung. As to its Uſe, as there is ſomething ſo diſtaſteful, not to ſay ſhocking, in the Thought, and as we have every where Manures enough, of one Kind or other, without it, 'tis more decent and better to let it alone. However, it has been and is uſed in ſome Parts of England; and in many Places Abroad oftener than is thought.

This is a Practice every where carry'd on clandeſtinely, for nobody would care to buy that Farmer's Corn, who ſhould be known to uſe it: but there are thoſe in ſeveral of our Southern Counties, who, if they thought proper to tell Tales, could ſay a great deal of the Profits riſing from it.

In Flanders it is regularly ſold; and profeſſedly and avowedly laid on Corn Lands; and 'tis well known that they uſe it freely in the Vineyards of Languedoc; where it has been employ'd with us, and the Uſe of it known, the Advantage has been known alſo. The Cuſtom, wherever it is us'd to this Purpoſe, is to ſpread it, for a Time, upon a Bed of Mould, and let it be expoſed to the Sun; after this it loſes a great deal of the ill Smell, and of its hot Quality; and is mixed with a larger Quantity of Mould, and then ſpread on the Land.

People are cautious of talking of this; but ſo far as can be collected that is the Practice. Perhaps if it were let into the common Mixture of the Dung Compoſt, it might add to its Virtue: but 'tis not needful there, nor finally with us, on any Occaſion whatſoever.

The Writers on Huſbandry adviſe the Farmer who ſhall chuſe to employ this Manure, to mix Straw with it in the Manner of Litter: but thoſe who have try'd this declare, that it does not ſucceed as is pretended. The Fermentation riſing from the Mixture of Straw, with the Dung of the Horſe, is very ſudden and very great, but the ſame does not follow on mixing it with the human Excrement.

Upon the whole, though a rich Manure, it is a filthy one, and is the leaſt manageable of any whatſoever, and, of all others, the moſt offenſive to the Servants employ'd in ſpreading it, as well as to the Thoughts of thoſe who are to feed upon the Corn that riſes from its Richneſs.

CHAP. XXXIII.

Of Urine.

URINE has naturally been named in the laſt, and ſome other preceeding Chapters, together with the ſeveral Kinds of Dung; with which it is always mix'd by the prudent Farmer; and which it aſſiſts greatly in its Office. However, it may be proper, at the End, to mention its Effects ſingly; and the more, becauſe they may very naturally, and are very generally miſunderſtood.

The Urine of our own Species, as well as of Cattle, is ſeen to turn any Plant brown upon which it frequently falls; and finally to kill it. And from this there grew an early Prejudice againſt it, as an Enemy to the Growth of Plants of all Kinds; and ſome of the antient Huſbandmen were, for that Reaſon, as careful to keep it out of their Dung, as we are to get it mix'd with it at preſent.

But this ſhould have been conſidered, that many Things which, in their natural State, or being uſed alone, are deſtructive of Plants, yet, in a proper Management, promote their Growth in the greateſt and moſt obvious Manner.

Lime alone is not a Soil for Plants, nay it may be made to kill any. Yet nothing gives Fertility to many Kinds of Soil equally with Lime, when properly applied, as has been hinted already, and will be ſhewn more at large hereafter.

In the ſame Manner Salt prevents the Growth of Vegetables, if ſpread thick over the Ground; and will kill them as certainly as Urine, if laid about their Roots, or ſprinkled over them frequently in a ſtrong Brine. The Effect it takes is juſt the ſame with that of Urine, making the Leaves turn brown and fall off, and, at laſt, the whole Plant to periſh. Yet we find Salt, properly uſed, is a great Promoter of the Growth of Plants; and exactly the ſame is the Caſe with Urine. Theſe Things are too violent in their natural and naked Condition, but, when properly ſoften'd by Mixtures, they are excellent.

Urine has alſo another Advantage over many of the other hot Manures, which is, that it is of itſelf, capable of Fermentation: and by this Means becomes quite a different Thing. The Uſe of fermented Urine is not enough known in England. In Holland they have found it; and they know it to be one of the richeſt Manures in the World. They are always very careful of the Urine of their Cattle, which they ſometimes let run among the Dung, to aſſiſt its Fermentation, and ſometimes uſe ſingly.

Even Urine, in its natural Condition, is not ſo fatal to Plants as is commonly imagin'd. If it be repeatedly thrown upon them, it will, doubtleſs, kill them; but Experience ſhews, that after it has made them brown or yellow, if no more be thrown on, they will not only recover, but grow much finer than before.

Dung will deſtroy Plants, as well as Urine, if it be pil'd up about them in the Time of its Fermentation; and it will hurt the Growth on many Soils, if laid on in too great Quantity: and Urine, like Dung, will promote their Growth, when it is uſed with Diſcretion and Moderation.

It is better for Corn Land than Paſture: as to its Uſe in the manuring Soils for Trees, 'tis at preſent unknown, but there was a Time in which People were acquainted with it; and they aſſure us it is excellent for this Purpoſe. The antient Writers in Latin, upon Country Affairs, adviſe the frequent Uſe of it; and they direct that it ſhould be old, or long kept Urine, ſo that it is plain they very well knew the Difference between freſh Urine, and ſuch as had been fermented.

An Inſtance which has been mentioned already of a Perſon procuring a vaſt Crop, by dreſſing the Ground with Woollen Rags ſoaked in Urine, is a Proof, at leaſt, that Urine, in a diſcreet and moderate Uſe, is no Enemy to Vegetation: but in the Eye of Reaſon it declares yet more in its Favour: for, probably, the Effect was as much at leaſt owing to the Urine as the Rags.

There has been alſo another Particular mentioned, of the Uſe of the Cleanſings of Roads where Horſes ſtale. This, more than any thing, confirms the Truth of what has been ſaid here concerning it: for it appears, that when theſe Cleanſings were quite wet, and the Urine of the Horſes among them was freſh, rank, and in great Abundance, it did Miſchief: but, on the contrary, when that Matter was dry'd, and the firey Parts of the Urine were evaporated, though its Salts remained, as was plain to the Taſte, it proved of excellent Service, and occaſioned a very happy Growth.

CHAP. XXXIV.

Of Rags.

THINGS that ſerve to no other Purpoſes whatſoever, generally are uſeful to the Farmer as Manure. We have an Inſtance of this in Rags, which when too bad for the Service of Paper-making, uſually fall to the Share of the Farmer. And he has his Advantage even in their Faults on the other Accounts; for the naſtier they are, that is, the dirtier and the more rotten, the better they ſerve him for enriching his Land.

The Reaſon of this is very plain, for their Naſtineſs ariſes from the Perſpiration of the Bodies of thoſe who have worn them; and all Animal Matters are good as Manure. In the other Reſpect, the rottener they are, the more readily they diſſolve with the Weather, and are waſh'd into the Ground.

The Original Reaſon why Linnen Rags ſhould be uſeful, is, in the Nature of their Compoſition; they are made of Vegetable Matter, and it has been ſhewn already, that all Vegetable Matter when it comes to decay, aſſiſts in the Growth of other Vegetables, enriching the Land for that Purpoſe. Now Vegetable Matter can never be in a more perfect State of Decay than when it is rotting from Rags; unleſs we ſhould name old Paper, which has been made of Rags, and which would doubtleſs prove an excellent Manure if it could be had in ſufficient Quantity.

Linnen Rags got into uſe upon this Principle; and they were found to anſwer beyond all Expectation, which was owing to the before mention'd Addition, their Naſtineſs; which being owing to the Sweat of the Perſons who wore them, could not but enrich the Ground greatly.

Theſe dirty and rotten Linnen Rags were what came firſt into the Hands of the Farmer, and are what he ſtill gets; for the cleaner and better Kind go to the Paper-mills, only the Refuſe coming to him. This in general conſiſts of ſuch as have been worn by the pooreſt and miſerableſt People, and conſequently have been as fully as poſſible impregnated from their Bodies.

This is a diſguſtful Matter to conſider as a Manure; that is, as a Subſtance which is to furniſh the Corn we are to eat: but the Farmer finds his Account in it. It is indeed more diſtaſteful, if rightly underſtood, than the Uſe of human Excrements. Whoever ſhall paſs by thoſe Cellars in which Rags are ſorted for the Uſe of the Farmers, will perceive a Smell from their Doors worſe than that of Bog-houſes by many Degrees: it is indeed ſo horrible, that the Wonder is, it does not breed a Peſtilence. But this is all a Proof of the Fruitfulneſs of the Materials; for all this Smell ariſes from the ſame Cauſe that will raiſe a Ferment in the Soil; and as to the Stench itſelf, it is either loſt in the Air, or left behind by the fine Veſſels of the Plant; never getting into the Corn. This is certain, for Hertfordshire is the County where theſe filthy Things are moſt us'd as Manure, and no Corn is ſweeter than theirs.

After Linnen Rags had been famous many Years, Woollen began to be thought of; and they are at this Time uſed in ſome Places, but not univerſally. Of their Effect when ſteep'd in Urine, I have ſpoken already; but without it they are very rich. Nor is this at all wonderful: for as the Linnen Rags enrich Land as they are of Vegetable Origin, theſe Woollen ones do it as they belong'd originally to an Animal Body, ſuch Things being known to be richer than Vegetables, on this Occaſion.

In thoſe Places where they have got into the Uſe of Woollen Rags, they buy the Refuſe of Taylor's Cuttings; and they find them anſwer very well: but the proper Woollen Rags for the Farmer's Uſe muſt be thoſe to be bought of the Ragmen in London; and this, for the Reaſons given already about Linnen Rags, which hold true more largely here; becauſe they are rotten, and becauſe they are full of Animal Matter from the Perſpiration of thoſe People who have worn them.

I doubt not but Woollen Rags of this Sort, will be found upon Trial, a richer Manure than any Thing of the Kind: and they may be had cheap enough, being of leſs Uſe in any other Reſpect than the others; and for that Reaſon pick'd from them.

Rags are of the Nature of thoſe rich Manures that ſuit all Soils, but thoſe on which they are found moſt beneficial, are the chalky and clayey. They warm, looſen, and enrich beyond moſt Things, and none ſhew more ſpeedy Effects. London is the great Market for them; but the Farmers in the neighbouring Counties often ſend for them thirty or forty Miles, and find good Account in the Expence.

The Way to uſe them is the ſame which they take with Pigeon's Dung, and ſome other of the rich and light Dreſſings. They are to be chop'd very ſmall, and ſprinkled evenly over the Land juſt after the ſowing of the Corn, ſo that they may give their Virtue to it from the very firſt ſhooting.

About five and twenty Buſhel is the Quantity for an Acre.

In the ſame Manner that they uſe Rags in ſome Places, the Farmers in others uſe old Rope, untwiſting and chopping it fine, and then ſprinkling it over the Land. This is ſerviceable as it is the decay'd State of ſome Vegetable Matter; but it is inferior to Rags, becauſe of the Virtue they have got in the wearing. It is reaſonable to ſuppoſe this ſhould be the Caſe, and it is found ſo in Practice.

In ſome Parts of Buckinghamshire, and the neighbouring Counties, they uſe Linnen and Woollen Rags on their binding Soils in a larger Way; not laying them on as a top Dreſſing, but plowing them in as common Manure. In this Caſe they chop them, but not ſo ſmall as for the other Uſe, and ſprinkle them by hand evenly over the Ground, allowing a much larger Quantity than the other Way: they plow them in about Midſummer, and leave them to enrich the Land againſt the Time of ſowing Wheat.

Mr.

Mr. Ellis ſays, they have of late got this Practice alſo into Hertfordshire, where they uſe it on Chalk and chalky Loams, allowing five hundred Weight of the Rags to an Acre. This is a more laſting Advantage to the Lands; for the other only ſerves the ſingle Crop over which it is ſown.

The Uſe of Woollen Rags ſeems to have begun in Oxfordshire, where at this Time it is more general than any where elſe in the Kingdom. The Farmers here buy at a ſet Price the Refuſe of the Taylors for this Purpoſe, and it has been a Traffick in the Days of their Anceſtors, ſo far back as they have any Tradition. The Effects are plain enough, altho' not uſing the beſt Kind of Rags, they have them not in the greateſt Degree: and it is aſtoniſhing, that a Manure ſo well known, and ſo beneficial in one County, ſhould not Ages ago have ſpread itſelf from thence alone through every Part of the Kingdom.

BOOK II. PART II.

Of Artificial Manures.

CHAP. XXXV.

Of Lime.

Its various Materials, and the Manner of making it.

THE employing Lime in Huſbandry, has been one of the great Articles of modern Improvement in that Science: and it is now ſo well underſtood, that there is Reaſon to believe, the Uſe of it will ſoon be univerſal. As there is a great deal of Difference between one Kind of Lime and another; and many Niceties to be obſerv'd in the Uſe of it, nothing can be more needful than a regular Account of its Nature and Effects. Lime is one of thoſe Things that are able to do great Good; and in Conſequence it is capable alſo of doing a great deal of Harm in the Hands of the unſkilful. It would be well that every Farmer in England were acquainted with the Virtue of Lime; but it is neceſſary at the ſame Time that he perfectly underſtand how it is to be uſed.

In the firſt Place, Lime is of ſeveral Kinds; for it may be made from a great many different Materials; and it partakes of their ſeveral Natures.

Lime may be made of Lime-ſtone, Marble, Chalk, Sea Shells, and many other Things; but the two principal Kinds are thoſe made of Lime-ſtone and Chalk. Theſe differ very much in their Nature; but we cannot ſay properly that either is beſt; for they ſeverally are fitteſt for different Kinds of Lands: the true Knowledge the Farmer ſhould have of theſe Kinds is, to what Purpoſe each is ſuited.

I would adviſe every Huſbandman to burn his own Lime; and for that Purpoſe ſhall give him ſome very eaſy Rules for the Choice of his Materials. In ſome Places he may find both Lime-ſtone and Chalk upon his Ground: he ſhould then make both Kinds; but if only one Sort of Materials can be had, he muſt make amends for that Defect, by a more careful Study of the Way to uſe it.

Chalk every one knows at Sight: of this I ſhall only ſay, that the hardeſt makes the beſt Lime; and this is for the Farmer's Advantage; for the ſoft marly Chalk is fit for his Uſe in its natural Condition, and the harder he can make fit by this Practice of burning it.

Lime-ſtone is much more common than the Farmer may imagine. It is of various Colours, and Degrees of Hardneſs; but inſtead of refering him to the Skillful for chuſing it for him, I ſhall give him one eaſy Method of doing this for himſelf.

Let him take a ſmall Bottle of Aqua Fortis with him when he goes over his Land to look after Lime-ſtone, and let him pour a little of it upon every Stone that looks fit for the Purpoſe: it will hiſs and bubble up when it falls on Lime-ſtone; but it will run off from all others like Water. This the Farmer may depend upon as an infallible Rule, that every Stone which makes Aqua Fortis bubble, is fit for Lime; and no Stone but what does, will ever make Lime freely, or fit for his Uſe.

Having thus found what Materials his Land affords for this excellent Manure, let him build his Kiln for preparing it. This is beſt done in a ſquare Hole dug for that Purpoſe in the Ground, in ſome waſte Place that lies conveniently for the Materials. The Kiln is to be in Shape like a Funnel, wide at Top and narrower all the Way to the Bottom. It muſt be firmly built, and lin'd on the Inſide with a Wall of Lime-ſtone.

Toward the Bottom of this Kiln there is to be a Hole to let out the Aſhes of the Fuel: and above this there muſt be an Iron Grate on which to lay the firſt Parcel of the Materials. Some ſupply the Place of a Grate by an Arch-work of Stone, the ſame with the Lining of the Kiln, but the Grate is very much the beſt Method.

When the Kiln is thus prepared, the Farmer is to get together in two Parcels, his Materials for the Lime, whether that be Chalk or Stone; and his Fuel.

This Fuel he may ſuit to his beſt Convenience, for almoſt any Thing that will burn will do. Coals or Wood ſerve equally well: or very good Lime may be made with Furze Buſhes, Peat, or Fern; which laſt, though ſo light a Weed, burns with a ſurprizing Force.

When all is ready, he is to begin by laying a Layer of the Stone or Chalk looſely upon the

A. Drain from the Stable.

Section of the Pit for Compost of Dung.

B. Drain from the Cow-House.

THE
PLAN OF THE
DUNG-PIT.

Falling of Chalk.

Section of a Lime-kiln.

Wale delin.

THE COVER'D FOLD FOR SHEEP.

Boyce Sculp

Engraved for the Compleat Body of Husbandry: Printing by the King's Authority in Weekly Numbers, at 6d. each.

Grate, and over that a Layer of Fuel: thus he is to continue putting a Layer of one, and a Layer of another, till the Kiln is quite full, taking care that the uppermoſt Layer be of the Fuel, not of the Stone or Chalk.

All being thus prepared, Fire is to be given to the Fuel at the Aſh-hole, and it is to be left to burn up, and the Lime will be made of itſelf, without farther Trouble. This is the general Method.

As to the Quantity of Fuel, a Hundred of three Foot Faggots will burn forty Buſhel of Chalk. If Sea-coal be uſed, ten Buſhel will ſtand for the Hundred of Faggots; and the Lime will be made in four and twenty Hours.

Lime-ſtone, according to its Hardneſs, takes more Time, and a larger Quantity of Fuel; but, in general, it anſwers very well to the Expence; being, on moſt Occaſions, very much preferable to the Lime that is made of Chalk.

As to the Quantity of the Lime, Chalk loſes about one third of its Bulk in burning; Stone loſes alſo in Proportion; thirty Buſhels of Chalk make twenty of good Lime, and ſo in Proportion, according to the Nature of the Stone.

Where Chippings of Marble can be had, they make the fineſt and richeſt Lime for Manure in the World: but theſe can ſeldom be in the Farmer's Reach.

In Derbyshire they throw out, among the Refuſe of the Lead Mines, a Kind of ſhining Stone, which they call Spar. It looks ſomewhat like Cryſtal, only not ſo clear: or like large Lumps of Bay Salt. It is whitiſh or browniſh, or of other Colours, and ſome of it that riſes in ſquare Lumps is uſed for ornamenting of Grottoes. This is an excellent Stone for the making of Lime. They burn it wherever it is to be had, and dreſs their barreneſt Lime-ſtone Lands with it: they find one Buſhel of this Lime as good as two of any other Kind whatſoever.

The ſofteſt Kind of Chalks, and ſome Sorts of Marle, may be alſo burnt to Lime with great Profit. As to the Marle, one Buſhel of it in Lime, is of equal Virtue with five in the common Way: and in the Choice of what Kind to uſe, the Farmer muſt have Recourſe to his Aqua Fortis, ſome will ferment and riſe in Bubbles with it, and ſome will not. That which ferments is fit for Lime, and the other is not.

Theſe ſoft Subſtances are beſt burnt with Fern, or other light Firing, and eighteen Hours generally bring them to Lime.

We will now ſuppoſe the Farmer in Poſſeſſion of his Lime; he is to conſider next in what Manner, and on what Sorts of Soils, he is to uſe it.

CHAP. XXXVI.

Of the Manner of uſing Lime as a Manure.

LIME is not one of thoſe univerſal Manures, which do equally well on all Soils. Its Effects are very great, but they are limitted. In general it does well on all light and dry Lands, but does not ſucceed on heavy and moiſt Grounds.

All ſandy, gravelly, and ſtony Grounds are improved in a ſurprizing Manner by Lime: but Clays get very little good by it. Many of the moſt barren Tracts of Land in this Kingdom, are of the ſandy Kind; and Lime has been uſed with ſuch Succeſs as an Improver on many of theſe, that it is ſurprizing it has not been try'd every where.

There is no ſaying what Fortunes might be made by encloſing heathy Grounds, and dreſſing them with Lime; but Huſbandry is not yet an univerſal Science; he who ſhall make it ſo will do more Service to his Country than all her Generals and Commanders, ſince the Time of her becoming a Nation.

Inſtances might be produced of Lands, at this Time, letting for the full Price of the beſt in their Neighbourhood, which fourſcore Years ago would not bring half a Crown an Acre; and the Beginning of theſe Improvements has been by Lime, which has alone rais'd Crops upon them at once, as good as thoſe on the moſt improved Fields.

The common Cuſtom is to uſe Lime alone, but from what I have ſeen, I ſhall venture to affirm, that it takes greater Effects when mix'd with other Matters. This is a Way of uſing Lime that will turn greatly to the Farmer's Advantage.

There have been thoſe who have ſent for Lime many Miles by Waggon Loads, and have found it anſwer very well: but in this there is a double Diſadvantage; not only the Price is greater, but the Lime is certainly the worſe. For when Lime is uſed alone, the beſt Way is to take it hot from the Kiln, in which Caſe the Land has all its Virtue. The Part which is loſt in keeping, is the beſt of all. This ſhould always be the Practice upon the moſt barren and deſperate Lands: for others it does very well a little cool'd, and in Mixtures.

The Way of uſing Lime alone, to the greateſt Advantage of all, is by laying it, in a proper Manner, on the Lands ſometime before it is intended to plow them up; and this I would adviſe to be done in the following Manner.

Let the Lime be carried hot from the Kiln, in the Quantity of about an hundred and fifty Buſhels to an Acre. Let it be laid in ſmall Heaps, and each of theſe cover'd with Earth. In this Manner let it remain to receive the Dews and Showers, till thoroughly ſlak'd: it will then eaſily mix with the Earth, and may be conveniently ſpread and plowed in.

This, though it appear a Way of uſing the Lime alone, really has the Advantage of a Mixture, which incorporates better with the Ground, than it ever would do alone. But in the plaineſt Way of uſing it ſingly, it does more than any other Manure whatſoever.

Stone Lime, ſprinkled over a bare Piece of poor, ſandy, barren Ground, and left to ſlake, will render it fruitful without any farther Care or Trouble, nothing need be done but the common Plowings and Sowing, and there will be a Crop: but not ſo large as if the ſame had Lime been uſed with better Management.

Stone Lime is the beſt for Gravels and ſtony Soils: Chalk Lime does better on the looſe barren Waſtes, where there is only Sand and a poor

Earth. And on light Soils that have ſome Heart, or ſome good Mould among them, the beſt Kind of all is that made by a ſlight burning of the ſofteſt Chalk, or of the chalkey Marles before deſcribed; or that light Kind of Lime which they make in ſome Places, of broken Chalk wetted and moulded like Bricks.

This is what Experience ſhews of the ſuiting the different Limes to different Soils; and the Farmer ſhould attend carefully to it: for by obſerving it he may reap at leaſt double the Advantage that he could from a random and inconſiderate Uſe of this Manure.

Nature, in this Reſpect, is kind to the Farmer, as in many others, if he will but lay hold of the Advantages ſhe offers. Where there is a ſtony Soil that requires Stone Lime for its Improvement, he will commonly find Lime Stone for the making it, ready at hand.

I now come to ſpeak of the ſeveral Mixtures that may be made with Lime, for the uſing it to moſt Advantage, and theſe are three; 1. Dung; 2. Mould or Mud; and 3. Aſhes. Of all theſe Trials have been made, and the Succeſs that has followed, ſhould encourage the prudent and ſpirited Huſbandman to imitate them.

For a very barren ſandy Soil, although Lime alone will anſwer well, yet Experience ſhews the very beſt Manure is a Compoſt of Lime and Cow Dung. The Cow Dung ſhould be double the Quantity of the Lime: it muſt be mix'd with it hot from the Kiln, and then laid up in Heaps, cover'd with a thin Cruſt of the Soil par'd from the Surface. Let this be done a Year before the Ground is broken up. But as ſoon as the Rains and Dews have thoroughly ſlack'd the Lime, let the Heaps be broken, and after mixing thoroughly the Lime, Dung, and Earth, let the whole be ſpread as even as poſſibly over the Land. The Produce upon plowing at a proper Seaſon will be very great, and the Ground will have a more laſting Benefit, than it would have received from Lime alone.

Some have mixed Horſe Dung with Lime, and dreſs'd their light Soils with it; and it has ſucceeded very well, but Experience ſhews Cow Dung is better.

For a dry gravelly Soil that is lean or hungry, the beſt Way of uſing Lime is, mix'd with fine black Mould or River Mud.

If Mould be uſed there ſhould be four Times the Quantity of the Lime, if it be Mud three Times as much is ſufficient: but let the Farmer always obſerve, that if he uſe Mud it muſt not be freſh from the River, for that would ſlack the Lime too ſuddenly; but ſuch as has lain ſpread out, 'till it is crack'd on the Surface, and tolerably dry. Either Mixture is excellent, giving a laſting Heart to ſuch Land, as well as the Warmth and Spirit for the preſent Crop.

For a moſſy Ground the beſt Way of uſing it is with Aſhes; and no Aſhes are ſo good for this Purpoſe, as thoſe of the Land itſelf. The beſt Way of doing it is thus.

If the Land be very ſedgy, as ſuch Ground often is, ſet Fire to the dry Stuff on the Surface, and let it take its own Time to burn. This will often burn away two or three Inches of the Soil, ſometimes a great deal more, leaving the Aſhes ſpread very evenly and well. The Lime is then to be ſprinkled over theſe Aſhes, about an Hundred Buſhels to the Acre, and all plowed in.

If the Surface will not burn, the Turf muſt be pared off, as will be directed hereafter, under the Head of Burnbaiting; and the Aſhes, after the Turf has been burnt, are to be mix'd with Lime, and plowed in as before. In either Caſe the Mixture of the Lime and Aſhes takes an Effect much greater than either could have done alone; and the worſt Kind of moſſy Land will be thus improved, to ſuch a Degree, that a firſt Crop ſhall pay all the Expence of Dreſſing and Encloſure. Of this there are indiſputable Inſtances upon Record.

With reſpect to the Time which the Benefit ariſing from Lime laſts, there is great Difference from the Nature of the Soil, of the Lime itſelf, and from the Manner of uſing it. One great Complaint is, that Lime is expenſive, and that its Good is not laſting: but this may be remedy'd both Ways, by due Care and Management, added to a Knowledge of the Buſineſs.

In the firſt Place, a great deal of the Expence of Lime may be ſaved, as the Farmer is now taught to find the Materials, and burn it for himſelf; and in the next, the Benefit ariſing to Lands from its Uſe may be made much more laſting, by the proper Mixtures and Management; and by a proper Care of the Land itſelf.

The worſt managed dreſſing with Lime of the weakeſt Kind, ſuch as that made from ſoft Chalk, will have the ſame laſting as Dung, that is, it will enrich the Land for three Years. Good Stone Lime well made and well laid in, will very well laſt Five Years. With Horſe Dung its Virtue will hardly hold out quite ſo long; but with Cow Dung it will afford two good Crops more. But then it muſt be allowed, that the firſt Crops from Horſe Dung and Lime will be richer.

Lime, with Aſhes made by burning the Land, laſts but three Years in its full Effect: but then the Land is not left ſo impoveriſhed, as it is where the Burnbaiting has been practiſed on it alone.

The Dreſſings of Lime and Mould, are the moſt durable of all: and with a little Refreſhment of the Land, at Times, will laſt ten or twelve Years.

This is what Experience confirms, and the Farmer ſhould regard it accordingly.

Additions to the Article of Lime, from a Correſpondent; containing an Account of making and uſing it in Staffordshire *and* Derbyshire.

There are ſuch great Improvements made by Lime of late Years, and ſuch prodigious Quantities now burnt, in compariſon of what was within the Memory of many now living, that it may deſervedly be called, A general Improvement; and perhaps, if all Things be duly conſider'd, it will be found the moſt uſeful artificial Improvement in the whole Kingdom; and conſequently deſerves to be conſider'd in a very particular Manner, from the Method of getting it in the Stone Pit, to the Manner of burning it into Lime, and ſo carried on through the various Ways it may be uſefully applied in, as well as the ſeveral great Improvements produced

by it when properly applied, to almoſt all Sorts of Corn Land, and Graſs Grounds, both natural and artificial.

But before I enter into theſe Particulars, it may be proper to obſerve, that Lime-ſtone Ground, is generally of a ſweet and rich Nature, and the Waters which run from it, very much improve the Lands they flow over; whereas thoſe Waters which come from barren Heaths, and ſeveral other Sorts of hard Land, are frequently prejudicial, and do great Damage to the Grounds they flow over.

The Richneſs of the Dove Bank Lands in Staffordshire, which have been eſteem'd equal to any in England for feeding, is certainly owing to the Waters running from the Lime-ſtone Hills, and the Sheep Dung they carry along with them; ſo that they who have proper Opportunities of turning Lime-ſtone Water over their Grounds, may know how to apply it for their particular Benefit; and alſo to avoid ſuch Waters as are prejudicial. And the Waſh of plowed Fields and rich Meadows are alſo frequently very advantageous, where they can be properly applied, as well as the Waſh of Rivers paſſing near great Towns.

And indeed Lime-ſtone itſelf which has not been burnt, will alter Ground for the better, as is evident from ſeveral Places on the Moors, where Loads of Lime-ſtone having been ſhot down, and lain there ſome Time, it has quite alter'd the ſame from a coarſe ſour Graſs, to that of a kind ſweet Sort.

There are two Sorts of Lime-ſtone commonly to be met with, one a beddy Sort lying almoſt in Courſes, and in ſome Places almoſt as even as Bricks, which is generally got pretty eaſily, eſpecially if Beds of Earth lie mixed with it; of which a Man will then get a great Quantity in a Day, ten or a dozen Ton or more; and this Sort is commonly of a yellowiſh Caſt, and in general makes the whiteſt Lime; and a ſolid ſquare Yard is commonly computed a Ton.

The other Sort is uſually of a more rocky Nature, and much harder to be got; ſo that we are often forc'd to blaſt it with Gun Powder; and if the Rock be very firm, it is ſcarce to be thought what large Pieces of the Stone will ſometimes be blown into the Air, and how a little Powder in an Augur-hole, at about ten or twelve Inches deep, cover'd with Sand, will pierce the moſt ſolid Rock, ſhake it, and open the Joints ſo that it may be got by Wedges: but if the Rock be jointy, the Blaſts will generally have little Effect, as the Powder then finds a Paſſage through the Joints.

Stone of this Sort is in Reality the ſame as Peak Marble, and where it will bear poliſhing, is got and uſed for that Purpoſe, and very large Pieces are met with in ſome Places proper for it.

This Stone is commonly of a blueiſh Caſt, and ſpecifically heavier Foot for Foot than the other Sort, and conſequently muſt turn out more Lime when burnt, and is generally eſteemed ſtronger for Land than the other, though the former is whiter: for which Reaſon I uſed to ſend for the former for the laſt waſhing a Room. And here I cannot but obſerve, That I never knew or heard that any Workmen, though employ'd for Numbers of Years, and almoſt conſtantly both Day and Night, engaged in the Smell and Smoak of a Lime Kiln, were ever any way prejudiced in their Health by it, tho' it is Death to all Vermin about them; and we have frequently Inſtances of Perſons loſing the Uſe of their Limbs, or their Lives, by going too ſoon into green Houſes, or Rooms new ſhot with Lime, before the Mortar made of this Lime and Sand, has been very well aired, and long ſeaſoned.

In this laſt mention'd Stone are found that infinite Variety of ſeeming Shells and Bones, which are viſible in the Peak Marble; and, to give any tolerable Account of which, has ſo much perplexed the Philoſophers.

I have ſeveral, and have ſeen Numbers of ſeeming whole petrified Cockles, Oyſters, and Bones of Fiſh; and have one which is in Appearance the petrified round Back Bone of a Fiſh, with fine riſing ſharp Edges, at equal Diſtances, not half an Inch Diameter; the whole of about three Inches long, faſt at each End in the Piece of the Lime-ſtone it is in.

There are two Sorts of Sale Lime Kilns uſed in different Parts of Staffordshire and Derbyshire; one of which they fill, and cloſe, or ſhut up, burn it, and let it cool; and then draw it all out, the Days being appointed for the Farmers to fetch it. Theſe Kilns generally hold thirty or forty Quarters of Lime, being ſix or eight Waggon Loads; ſo that Mr. Ellis muſt be miſinformed about a Load being a Kiln of Lime near Derby.

And indeed every new lighting a Kiln occaſions ſuch Loſs and Expence, conſidering the Quantity of Lime burnt in one, that few like it; for which Reaſon thoſe called running Kilns, commonly kept in from the Time they are lighted, as long as they have Cuſtom, and often from April to October, are generally choſe for Sale Kilns; and alſo by thoſe who burn for their own private Uſe.

The publick running Sale Kilns are generally about ſeven Yards deep, and contrived either at the Side of a Hill, or by ſinking the Ground, ſo that the Workmen may have Room at the Bottom under the Cover of the Kiln to draw out the Lime, and alſo Conveniency to lay ſome by, and to ſet ſome Loads ready for Cuſtomers, and the Top of it to be readily come at, to bring the Stone and Coals to burn it with, and to have Room to break the Stone, and fill the Kiln.

The Bottom ſhould be laid with a good Stone dipping toward the Mouth it is drawn at; and at about two Foot high, there is a Stone runs croſs the Kiln, called a Horſe, for the Lime to fall down on each Side of it, and to prevent the Lime falling down altogether; which Stone ought to be ſuch as will bear the Fire, ſince if it break, the whole muſt ſometimes be drawn out again not well burnt: and the Stone facing the inner Part ſhould alſo be of the ſame Nature, eſpecially toward the Bottom. Sometimes indeed Lime-ſtones are uſed alſo for the Inſide near the Top, and will laſt a Year, and may be eaſily repaired the following Spring.

The Kiln, here, widens gradually from the Bottom to nine or ten Foot high, to about nine Foot wide, for about two thirds of the Height, and then is drawn in again gradually to about ſix Foot wide, which makes it burn better, ſave Coal, and is eaſier cloſed up at the Night till Morning; ſo that the Fire gets not up too ſoon and waſtes, when the Stone is commonly heaped up high like a Pyramid.

At firſt lighting it, towards the Bottom, they uſe Wood or Gorſe (Furze) then half Coal and half Stone, and encreaſe the Quantity of Stone gradually, till they ſet on twenty Scuttle full of Coals to ſixty of Stone, which is called a Bed, which Stone is about a Ton; and when the Kiln is warm and goes well, one Horſe Load of Sleek, or Coals, will burn two and an half, three, and ſometimes, in good Weather, more Loads of Lime; and a Kiln will draw ſeventy or eighty Sale Horſe Loads a Day, which are generally about three Buſhels, even by the Wood, to the Load, or two and an half full up-heap'd Meaſure: two Buſhels which I burnt, of full Meaſure, was fourteen Stone Weight, and few Sale Carriers will carry more. What is called a Buſhel in the South, is called a Strike in thoſe Counties.

The Coals, or Sleek, they burn Lime with, are uſually an ordinary Sort of Coal, ſubject to ſmell and ſmoak very much, and conſequently are little burnt in better Families; the Price of them is about Two-pence per Load, and the Expence of Carriage, according to the Diſtance from the Lime Kiln, generally about a Penny a Mile in Staffordshire.

Theſe running Kilns burn Lime much cheaper, and full as well as thoſe that are only once filled, burnt, and let out again; and have not ſo much Waſte in Proportion; and, I think, few ſeem to have any juſt Notion of Lime burning, which makes me ſay ſo much on this Subject.

A running Sale Kiln employs four Men; one to get the Stone, one to wheel it to the Kiln, and the other to draw the Lime, fill the Bags, and help to load Horſes, and ſet on Beds of Stone and Coals above, in Proportion to what is drawn below.

The Wheeler has but common Labourer's Wages, the Stone-getter, according to the Nature of the Stone, but the two Burners, who ſeldom leave the Kiln, expect, one Way or other, near double Labourer's Wages, or more, eſpecially as they ſhould be experienced; and are generally tied to it from April or May, till October, according to the Seaſon and Cuſtom. So that any Perſon may pretty near compute the general Expence of burning of Lime, great Part of which depends on the Nearneſs and Cheapneſs of Coals and Lime-ſtone.

The building my private Kiln coſt me about three Pounds, and it would draw fifty, or near ſixty Quarters per Week of up-heaped Meaſure; and with very little Repairing has laſted, occaſionally, above thirty Years; and I had the Stone got and bedded, and gave a Man and his Boy One Shilling and Six-pence for each ten Quarter they burnt and delivered, but generally let him have ſome farther Advantages.

The Curious will excuſe my mentioning an Obſervation, made by ſeveral Lime-burners; that all the Art they have, about May they cannot keep the Lime from falling to Powder, though they can, for a conſiderable Time, at all other Seaſons; and ſome of them think the Return of the Heat and Spring has an Influence upon the Stone, as well as upon Plants and Animals.

There is one thing relating to Lime, it may be proper to caution thoſe concerned with it, to be careful about; which is, that they be very cautious how they lay it in Buildings, or near Wood, or any thing combuſtible, ſince it is very ſubject, on Wet coming to it, or even ſometimes with the Moiſture of the Air or Earth, to fire any thing near it. And on very wet Days Lime has ſometimes fired the Sacks on the Horſes Back, and the Carriages it is taken in from the Kiln.

The common Price at the Sale Kilns, near Buxton in Derbyshire, and at Caldon Grange in Staffordshire, is about Five Shillings and Six-pence the Sale Load per Score, and Four-pence per Load to Farmers, who generally carry three up-heaped Buſhels, there called Strikes: and from thoſe two Places, I apprehend, there are full a thouſand Loads a Day carried round the Country, beſides what private Perſons burn for their own Uſe.

Some of the preſent Lime Burners, at the publick Sale Kilns, now make uſe of Waggons, like thoſe uſed to run on wooden Frames, at the Coal Pits in Shropshire, and at Newcastle; which, going on low wooden Wheels, and on a Frame of Wood, are eaſily loaded, and drawn from one Place to another; and, when placed over the Boat, forty Hundred of Coals are unloaded into the Boat in an Inſtant, by opening a Trap Door at the Bottom of the Waggon, and the Coals drop down. And the Lime Burners load Waggons like thoſe with Stone, broken to the proper Size at the Stone Pit, and then draw the Waggon over the Kiln, on a Frame, and then unload it into it by the Trap Door; which ſaves all the uſual filling of Wiſkets, and then throwing them into the Kiln one by one. And by this Method two Men almoſt do the Work of four, to the great weekly Advantage of the Owners.

There is one Thing I have frequently obſerved, that old Stone is neither ſo eaſily burnt, or makes ſuch kind Lime as that which is new got, and even lying a few Days when got, expoſed to the Air and Weather, is to its Diſadvantage in the burning it into Lime, as well as the out Part of the Lime-ſtone Rock, which has been long expoſed to the Wind and Weather. And the ſame has been commonly obſerved of ſeveral Sorts of Free-ſtone, that they are much ſofter and eaſier worked when new got, than when they have been expoſed to, and hardened by, the Air, Sun, and Weather.

There is ſome Art and Care neceſſary in breaking the Stone in proper Sizes for the Kiln, and the great Hammers are made with Faces ſuitable to that Purpoſe; for a large flat Stone will be burnt well, when a round lumpiſh one will not, though of much leſs Size. And the throwing in much ſmall Stone is ſubject to choak the Fire, nor is it choſe but when they lay ſome round the Edges, to prevent the Fire burning too furiouſly there.

Before

Before I enter into the general or particular Uſes of Lime, there are two or three Things which, from my own and other Peoples Experience, I would particularly recommend to the Reader.

The firſt of which is, to Lime the Ground (I ſpeak chiefly here of Graſs Ground) as ſoon in the Year as conveniently may be; for I am ſatisfied that Lime laid on Ground before Midsummer, is much more beneficial to it, than what is laid on ſome Time after. And the later it is laid on in the Year, it muſt conſequently be proportionably the worſe for it; though the Lime Burners will tell you it is equally good then.

But as to laying it on ploughed Land, the Courſe of Tillage muſt be obſerved; and as to Compoſitions, or Mixtures of Lime and Dung, and Soil, &c. the Seaſon of the Year is not ſo much to be regarded.

But in all theſe Caſes I would adviſe, not to let it lie and mortar (as they call it) before it is uſed, which is a great Miſtake, and very prejudicial, though I have known ſome old Farmers practiſe it; but by all Means ſpread your Lime while it is in the Flour, when it is laid on Graſs Ground.

And I think it not adviſeable to lay Lime on where there is much Graſs on the Ground, which certainly muſt prevent its having ſo good an Effect on the Ground, as it will when the Ground is barer; nor will a Farmer be ſurprized to find, that his Cattle will not touch the new limed Ground, until ſome Rain has fallen to waſh the Lime a little in. After which they will eat of it, and prefer the Graſs of the limed Ground to any Quantity of Graſs of the unlimed Part of the ſame Field; but in a long dry Time it would not be prudent to Lime a Paſture all at once, for the Reaſon above.

The moſt learned and judicious Perſons will not pretend to aſſign Cauſes.—"I confeſs (ſays "an ingenious Gentleman) that I am ignorant "of the Cauſe of this great Power (of Lime) "whoſe Effects are aſtoniſhing, as much as I "am of Elaſticity or Attraction; though per"haps it is nothing but a Modification of thoſe "two conjoined, acting on, and exciting the "Fluid of Fire, which pervades, and is con"tained in every thing." But however unknown the Cauſe may be, or whatever Diſputes there may have been amongſt the Learned, to what Sort of Land it is properly applicable, and to which not; yet all agree, That,

Lime is an excellent Manure, rightly and diſcreetly applied, though they differ as to its operative Effects, and the Manner of applying it.

But what I am at preſent concern'd in, is not now to explain the Nature of Lime, or its ſurprizing Effects, and the Manner of its working; but only to ſhew how beſt to preſerve that Power, and apply it beſt to the Ends deſigned, that is, the Farmer's Benefit; and not let its Virtue be loſt, or waſted to no Purpoſe; which will explain, and in ſome Meaſure, juſtify the Directions above given.

Now it ſeems very evident, that all the Benefit of Lime muſt ariſe from ſomething in the Nature of the Stone itſelf, or elſe from the Heat communicated to it in the Lime-Kiln, or from both, and the Effects they produce in the Earth. And therefore the ſooner it is applied the greater Effect it muſt have; for it is very evident, that it loſes of its Heat and Virtue by lying expoſed to the Air, and that if wet gets to it, it muſt cool the Heat of it, and will make it (as they call it) clotter in Lumps, which muſt not only weaken the Force of the Fire within it, but alſo prevent the fine Particles of it operating, as they would otherwiſe do; and will prevent, or at leaſt leſſen, that Fermentation which is generally thought to produce that uſeful Vegetation occaſioned by Lime.

And certainly if Lime is laid on the Ground early, and when it is bare, whilſt fair warm Weather may reaſonably be expected, and ſpread whilſt it is the Flour, it will then enter the Pores of the Earth, and produce the deſired Effect there much better than when Rains fall, or cold froſty Nights leſſen its Goodneſs, or when much Graſs, or the Dews commonly on it cool the Lime, or abſorb the fine Particles of it, or at leaſt prevent its eaſy entering into the Ground.

It was before mention'd, that the moſt judicious in their niceſt Enquiries, do not pretend to aſſign Cauſes; that being in Truth out of the Reach of human Underſtanding, however vain and preſumptuous ſeveral are in their Pretences to explain every Thing.

Dr. Wallis, Mr. Derham, and Mr. Halley, freely confeſs it in their moſt curious Treatiſes on Philoſophical Subjects; and Mr. Halley in his Treatiſe, Of the Effects of Gravity, mentions ſeveral pretended Explanations of it, and ſays, "This is ſo far from explaining the Mo"dus, that it is little more than to tell us in "other Terms, that heavy Bodies deſcend be"cauſe they deſcend." And after anſwering their Arguments, then adds, "Though the effi"cient Cauſe of Gravity be ſo obſcure, yet the "final Cauſe is clear enough; for it is by this "ſingle Principle, that the Earth and all the "celeſtial Bodies are kept from Diſſolution, "which infinite Wiſdom ordain'd for their Pre"ſervation."*

The learned Dr. Freind, after many Conſiderations on this Subject, is at laſt for reſolving this, as well as other Things of this Kind, into the Will of God; and adds, "It appears there"fore that the true Method in which Philoſo"phers muſt proceed in their Inveſtigation of "real Science, is

"Firſt, They muſt ſearch out the Natures "and Forces of Bodies by a Multitude of Ex"periments; then neglecting to enquire into the "Cauſes from whence they proceed, they ſhould "purſue and explain the Phœnomena that reſult "from the innate Virtue of every one."

To apply what is before mention'd to the not being able to aſſign the Cauſes of Things, to this our preſent Subject of Lime; it appears hence very plain, that it would be of no Uſe to pretend to explain the real Nature of Lime, or the Manner how it operates on Bodies in reſpect to altering their Natures, or improving their Vegetation.

That it does ſo in numerous Inſtances is evident beyond Diſpute; and from the many Ex-

* *Philoſ. Tranſact. vol. 1. p. 471.*

periments already made, we may naturally conclude, that the ſame Cauſes will generally produce the ſame Effects, and conſequently we may juſtly apply it in the ſame Manner, and thereby reaſonably hope to obtain the ſame profitable End.

And thus by duly conſidering the Strength of our Lime, the Nature of the ſeveral Soils, the different Graſs Grounds, the various Plow Grounds, the very different artificial Graſſes, Plants and Herbs, to which we may, or intend to apply Lime; we may learn to proportion it to them reſpectively in ſuch Manner, and in thoſe ſuitable Seaſons, as may beſt tend to their ſeveral Improvements to our great Advantage: and alſo thereby learn to avoid every Thing prejudicial or fatal, which the over-liming Lands, or liming them improperly, might occaſion.

To give an Inſtance from Mr. Ellis, as to the Strength of Lime. He concludes that Lime agrees beſt of all with the cold wet Clays, becauſe his Neighbour with the limy Rubbiſh of his Kiln, dreſſes his high Clay Grounds that annually returns him vaſt Crops.†

† *Vol.* 8. *p.* 392—5.

Now if I underſtand Mr. Ellis right, what he calls limy Rubbiſh at the Sale Kilns, is called Lime Aſſe, and is of ſo little value, that Mountains of it are thrown by, it not being thought worth the Carriage to any Diſtance, as being a Mixture of ſmall Lime, Refuſe of the Coals, and accidental Rubbiſh; and a Cart Load of it is not thought of equal Value for the Ground as one Horſe Load of good Lime; and accordingly it is laid as thick on the Ground as common Dung.

So that this limy Rubbiſh partaking much of the Nature of Aſhes, can be no good Argument for Lime being beſt for cold wet Clays, which it certainly is not; though this Rubbiſh might improve his Neighbours wet Ground, and ſuch will be of Service to Land of this Sort when laid on in great Quantities; and if Chalk was burnt by Mr. Ellis's Neighbour, it will be ſtronger againſt Mr. Ellis, as that is not equal to Lime-ſtone in Strength and Goodneſs.

Again, Lime is found very beneficial to dry Lime-ſtone ground, where there is a tolerable Depth of Earth, but ſhould you lay a great Quantity of it where the Soil is very ſhallow, you would not only loſe the Expence of the Lime, but prejudice the Ground that it is laid on.

No experienced Farmer would expect any uſeful Produce from Lime laid on an entire Clay, or on an Heap of bare dry Sand, without what we call Earth or Loam, or ſome mix'd Soil over it: and there are ſome Lands very near ſuch bare Clay and Sand, to be met with in ſeveral Places, and to lay Lime directly on either of them, would certainly be both Labour and Expence in vain.

Too large a Quantity of Lime alſo will be hurtful, and this is the Caſe in all Manures whatſoever, both natural and artificial. For if you lay on too great a Quantity of any of them, inſtead of improving your Land, you will certainly ſpoil the preſent Produce of it, and ſome times for Years; till different Huſbandry, or the repeated Operation of the Sun, Air, and Weather, have brought the Land again to a proper Temperament, fit for the Growth of the Vegetables expected from it.

Inſtances of great Faults of this Kind in Dungs are not very common, and where they are committed, the Land will generally ſoon recover of itſelf.

But there are other Inſtances in Marle, and particularly of Salt Water, frequently to be met with; where, if too much of the former be laid on, or too much of the latter lie long on, or come too frequently over the Ground, ſuch Land will not be of any tolerable Goodneſs for many Years; and in ſome of theſe Inſtances never, until the Cauſe be removed, or a Remedy applied.

There have been ſeveral Inſtances of over-marling Land in Cheshire, by which the Ground has been quite ſpoiled for many Years; which yet after the Sun, Air, &c. have reduced it to a proper Temperament, has been very fruitful for many Years after.

And as to ſuch-like Effects of Salt, though that is certainly a wonderful advantageous Improvement, when properly applied; yet there are numerous Inſtances where the Salt Water accidentally lying too long on, has ſpoiled the Ground for a Year or two, which nevertheleſs were very fruitful for many Years after.

This was the Caſe of ſeveral Meadows of a near Relation of mine after the great Storm, as well as of ſeveral others.

But what will make this Matter evident beyond all manner of Diſpute is, the Caſe of the Marſhes and Lands near the Sea, which if conſtantly overflow'd every Time, produce very little of any Kind of Value; and the Lands adjoining to the Sea, if too often overflowed (by the Banks being let down) by high Tides. The prejudicial Effects are very viſible, for a Stranger may ſee by the Sort of Graſs how far the Sea Water uſually or accidentally comes too oft.

But when theſe Lands are well banked againſt the Tides, thoſe Meadows ſoon come to be good, and thoſe very Sea Marſhes gradually improve without any manner of Additions, or Huſbandry, to very good Paſture Grounds.

The ſame Effects muſt be naturally expected, and are accordingly found where Land is over limed; which recovers not, as obſerved by theſe Gentlemen, till tendered and altered by the Application of Things of a different Nature, or it be mellowed by Time.

And is not this the Caſe of every one of the different Improvements above mentioned in general; and alſo in a Thouſand other Inſtances in particular; in which if too much of one Sort of Manure or Improvement for one Sort of Tree or Vegetable be applied, it hinders its Growth, and perhaps proves fatal: when this very ſame Quantity of Manure would encreaſe the Growth and Goodneſs of other particular Trees and Vegetables, after a very ſurprizing and wonderful Manner.

On all Ground where any one would offer to lay Lime, there is a Coat of Earth or Loam Soil, though ſometimes very thin, not even an Inch and an half, and in others to a very great Depth;

Depth; in both which Lime will be uſeful, if applied ſeaſonably and in proper Quantities, according to the Depth, the Tenderneſs, or ſtiff Nature of the Soil; and it is the proper proportioning the one to the other, in which the Art of making Lime, and indeed of all other Manures, beneficial conſiſts.

In ſeveral Parts of the Moor Lands in Staffordshire, where the Ground is generally moiſt, and the Soil of a tender Sort, and often very ſhallow (much of it having been pared off for firing) yet even here, Lime ſpread on the Surface, without any further Care, ſweetens the Ground (and what they call there breaks it) generally in two or three Years, and produces a ſweet Kind of Graſs. This will continue good as other Lands, unleſs impoveriſhed by too much plowing, or carrying off the Produce, by which any Land may be prejudiced; but here, if you plow into the Clay, you ſpoil the Land.

I have limed Land of this Sort from four to nine Inches deep of Soil, laying on forty Buſhels, up-heaped, on an Acre; ſome of which brake and paſtured pretty well in two or three Years, whilſt other Parts of it were ſix or ſeven Years before it anſwered well; after which I plowed it up, and had very good Turneps, where I ſowed ſome, and good Crops of Oats on other Parts. And it will now paſture very well, and mow too after, provided it be not plowed above two or three Years, and it would be well then to give it a little Muck.

In moiſt Lands of this Sort the Lime is ſubject to ſink deep where the Soil is ſo; for which Reaſon it is oft convenient to plow it before it be gone too far, and the Benefit of it, in ſome Meaſure, loſt out of the Reach of the Corn and Graſs growing on it.

In the Peak of Derbyshire a great Quantity of Lime-ſtone Ground, with a coarſe Turf, has been improved with only liming it, and then letting it lie for Paſture Ground without any further Trouble or Concern about it, and it anſwers very well. Some Perſons have got good Eſtates by taking long Leaſes of Parcels of Commons, when divided, and then liming and ſetting them out again.

And here it may not be unuſeful to mention what happened to one of my Tenants, who was a very good Houſewife, yet found her Cheeſe bad, though made as uſual, the Year after the Ground was limed, which had ſo enriched the Milk, that it was neceſſary to break the Curd a great deal ſmaller than ſhe uſually had done, to make her Cheeſe then good; which ſhe thenceforward obſerved, and made exceeding good Cheeſe.

Theſe Inſtances confirm what was before mentioned, that Lime ſweetens Land, not ſours it, as Mr. Switzer mentions; nor is it to be taken as one of its good Qualities, to abſorb the Wet, as Mr. Ellis is pleaſed to imagine.

But the great Art in relation to Lime, and indeed to all other Improvements, is, how to proportion the Sorts and Quantity of the Manure to the different Soils, and to the Nature of the Things deſired to be produced; which, as to Lime, may be pretty eaſily collected in common Caſes, from what is before mentioned; and in any uncommon Caſe, may be readily brought to a Certainty, by a few Trials on ſmall Quantities of Land; and in moſt Caſes, eſpecially in good Land, with ſhallow Soil, it is better to repeat, than to lay great Quantities of Lime on at one Time.

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CHAP. XXXVII.

Of Soot.

WE come now to the Conſideration of another of the artificial Manures, which is alſo the Product of Fire; nor are theſe two all that the Huſbandman owes to the ſame Principle: Aſhes of various Kinds come in a natural Way, from the Effect of Fire upon our common Fuel, at the ſame Time that the Soot is formed: and they likewiſe are very beneficial to the Farmer.

Soot is of two general Kinds, the one, that which ariſes from Wood, the other that of Coal. Theſe differ very much in many Reſpects, but they are nearly the ſame in their Effects and Value to the Farmer. The Wood Soot is ſolid and ſhining, the Coal Soot looſer, and of a deader Colour. The Wood Soot ſells in London at a great Price, in compariſon of the other, for the Uſe of Chymiſts and Apothecaries, becauſe it is ſcarcer, the Fuel of London being, in general, Coal: but in the Country, where this is as common and cheap as the other, the Farmers rather prefer Coal Soot before it.

Thoſe who have written on Huſbandry, differ much in the Kind to which they give the Preference. Mortimer ſays Sea-coal Soot is by much the beſt, and Worlidge tells us, that Soot is a good Manure, eſpecially ſuch as is made of Wood: theſe are both very honeſt and good Writers; but Experience is to be prefer'd to either. The Truth is, that neither Kind deſerves a general Preference, but that Wood Soot is better for ſome Soils, and Coal Soot for others. Indeed the latter is beſt on the greateſt Number of Soils, and therefore the Farmer is right in valuing it the more. However, this Difference is not ſo great, that any Danger can ariſe from a Miſtake about it, for ſuch Land as will do well with one Kind of Soot, will alſo with another: all that the beſt Choice can do, gives only a little Advantage.

As there are Soils which refuſe the Aſſiſtance of ſome of the moſt enriching Manures; there are others of equal Efficacy, which perfectly well agree with them. This is exactly the Caſe in the preſent Inſtance. Clayey Soils, as we have ſeen already, will not bear Lime; but Soot is the peculiar and appropriated Manure for theſe; and it will do for them, all that Lime does for the others. But in this the Soot has the Advantage of the Lime, that there is no Soil whatſoever but it ſuits.

As to the ſuiting the particular Kinds of Soot to the different Soils, the Rule is this. For all clayey, chalky, and moſſy Lands, the Coal Soot is beſt. And this is the Reaſon why the Coal Soot is moſt in Repute in London for this Traffick, becauſe the Hertfordshire Farmers,

mers, who buy it almoſt entirely, have, for the moſt Part, clayey or chalky Soils to cultivate.

For gravelly, ſandy, and loamy Soils, the Wood Soot is preferable to that of Coal: and in its Nature indeed this Kind is better and richer than the other, becauſe, being made from a vegetable Subſtance, it is richer and warmer than that other which comes from a Mineral Origin; but the great Reaſon of the Difference which ſuits one Kind to one Soil, and another to another, is the Conſiſtence. The Wood Soot is in firmer and harder Lumps, the Coal Soot is crumbly; now in a clayey or a moſſy Soil, the Lumps of the Wood Soot would lie a long Time unbroken, whereas the Coal Soot breaks and mixes immediately. Experience ſhews alſo, that the Wood Soot will lie in large Pieces a long Time in a chalky Land, whereas the gravelly Sands, and ſandy Loams, cut and break it to Pieces in two or three Plowings, and ſpread and mix it thoroughly.

Perhaps it will be found, upon farther Experience, that the Benefit of Wood Soot is more laſting than that of Coal: but what the Farmer expects from Soot is, an immediate Effect upon the Corn. And in this he is not diſappointed, even on his coldeſt clayey Lands; for the Effect is like Magick. If the Soot be ſprinkled early over the Land, the firſt Shoot of the Corn will preſently be enough to preſerve the Root, and ſtand all Injuries; and the Virtue will continue with it to the full Ripening. A Field that has been dreſs'd with Soot may be diſtinguiſhed from one that has not, only by the Appearance of the Crop, at any Time. There is a Strength and Freſhneſs the Soot gives, that nothing elſe can.

Soot goes a great Way upon any Kind of Land. In general, a Buſhel of it, if it be tolerably good, is equal to a Load of Dung. Twenty Buſhels of Soot is a very fair Allowance for an Acre.

Sheeps Dung, as has been ſaid already, is, of all Manures, the very beſt for a dry Chalk; but the next in Value to that is Soot. For the ſandy Soils Lime and Soot are the two great Improvements; and the Advantage of Soot on Gravels would be much better known than it is, if it were not that the Practice of folding took its Place; than which indeed nothing is better.

The beſt Seaſon for laying on of Soot is toward the End of February, and as the Quantity that is neceſſary is ſo ſmall, in Proportion to that of other Manures, ſo much the more Care muſt be taken to ſpread it evenly and regularly: the Spring Rains perfectly waſh it in, when thus laid on; and the Effect is immediately ſeen.

The Benefit of Soot is not confin'd to Corn Lands; for it is of equal Uſe on Paſtures; and particularly on thoſe of a clayey Soil. When the Coldneſs and Hardneſs of the Ground has ſcarce ſuffer'd a tolerable Swarth to appear of many Years, a ſingle Dreſſing of Soot, ſprinkled on before the Spring Rains, has been known to produce inſtantly, as it were, a thick Covering of a fine ſprightly Green; with the Leaves full juicy and upright, and all the Signs of Health and Strength; and this has continu'd a long Time, though on Corn Land the Fruitfulneſs from the ſame Manure is ſhort.

Coal Soot is greatly to be prefer'd to Wood Soot for Paſture Grounds; for as there is there nothing to break the Lumps of the latter, they might lie a great while, and give up half their Virtue to the Air, inſtead of enriching the Land. The Coal Soot, on the other hand, waſhes all in immediately. After half a dozen Showers, if the Soot were pure and fine, it is not to be ſeen that any thing has been on the Ground. Aſhes are often mixed with Soot, by thoſe who ſell it, for the Sake of greater Profit, but here the Cheat is at once diſcovered.

I would adviſe the ſprinkling a larger Quantity of Soot on Paſture, than the Allowance for Corn Lands: about thirty Buſhels to the Acre: and this is worth while; as the Effect is ſo much more laſting.

The Writers on Huſbandry direct forty Buſhels to an Acre of Corn Land; and though the preſent univerſal Practice allows but about twenty, perhaps the Farmer would find he got more, in the End, by this double Allowance, even to his plowed Fields.

CHAP. XXXVIII.

Of Aſhes.

ASHES of every Kind whatſoever, are of great Uſe to the Farmer, but in theſe there is a great deal more Difference ariſing from the Materials which yield them, than in Soot.

Aſhes as they come under the Conſideration of the Huſbandman, may be reduced to three general Kinds. 1. The Aſhes of his common Fires. 2. The Aſhes made by burning Stubble, Fern, Furzes, and other uſeleſs Products of the Land; and, 3. The Aſhes of the Land itſelf produced by what we call Burnbaiting; which laſt ſhall be treated of after the others as a diſtinct Article, and in a different Chapter.

The firſt of theſe Heads may naturally enough be conſider'd alſo in a double Light, for there is a great Difference ariſing from the Fuel; the Aſhes of Sea-coal being different from the Aſhes of Wood; and thoſe of Peat from both.

In general when the Farmer's Fuel is Wood or Peat, the Aſhes of his Hearth differ very little from thoſe of burning Fern or Stubble; but when he burns Pit or Sea-coal, they are quite of a different Nature.

I heard in Lancashire a very great Account of the Aſhes of what they call Cannel-coal; but upon examining ſtrictly into that Matter, I think them inferior to our common Sea-coal Aſhes: for they have no more Richneſs, and they want that Harſhneſs or Sharpneſs which the others have. So that they enrich no more, and they do not divide the Land ſo much as the common Coal-aſhes.

The Aſhes of Scotch-coal, which are alſo white and ſoft, are of a middle Nature between the Lancashire Cannel-aſhes, and thoſe of the London Sea-coal. They are better than the former, and not ſo good as the latter: and this for the ſame Reaſon, as the others are worſe, they want Harſhneſs to cut a tough Soil; and

this is one great Advantage ariſing from the Uſe of all the firmer Kinds of Manures.

Wood-aſhes enrich a Soil more than Coal; the Coal-aſhes divide a Soil more than they, and they enrich it alſo at the ſame Time, tho' in a leſs Degree: Coal-aſhes are therefore beſt for a tough clayey heavy Soil, and Wood-aſhes for a light, poor and barren; or a too wet Land. In general cold and damp Lands, are they which receive moſt Advantage from Aſhes of whatever Kind.

Some Farmers think themſelves very frugal in buying up the Wood-aſhes, after they have been uſed in the bucking of Linnen; but they deceive themſelves in this, for thoſe Aſhes have altogether loſt their Salt, and are little more than ſo much barren Duſt. I have ſeen great Diſappointment from this Frugality.

Wood-aſhes when they are freſh and full of their Salt, ſhould be uſed alone. Coal-aſhes having leſs Richneſs, are beſt mix'd with Dung: Horſe Dung is fitteſt for this Service; or elſe the Compoſt of all Kinds of Dung together, which has been before deſcrib'd; and this Way they make an excellent Manure. The Sharpneſs of the Aſhes opening the Land in a ſurprizing Manner, and letting in the Virtue of the Dung.

Any Soil of whatſoever Kind that is too damp, will have Advantage from a good dreſſing of Aſhes: and where the Dampneſs is the principal Fault, Coal-aſhes are found to ſucceed better than thoſe of Wood.

Soap Boilers Aſhes after they have done with them have alſo great Virtue.

It is for this Reaſon of their correcting damp Grounds, that Aſhes, and eſpecially the Kind laſt mention'd, are ſo famous in Lancashire, and other Places, for the Improvement of their moſſy Lands, and deſtroying Ruſhes.

As to the Quantity of Aſhes to be us'd as a Dreſſing, four Load of Wood-aſhes, and ſix of Coal-aſhes, are the general Allowance for an Acre, but I think the Quantity may be increaſed with Advantage; and eſpecially that of the Coal-aſhes, which in Countries where Coal is the Fuel, are cheap enough, coſting nothing but Carriage.

I have obſerv'd that the Aſhes which have been us'd in bucking have no Virtue. We ſee by this that Wood-aſhes may be robbed of all their Efficacy by Water; and for this Reaſon they muſt be laid up for uſe in ſome dry Place, and no Wet of any Kind ſuffer'd to come near them: otherwiſe the Farmer may chance to lay Duſt upon his Land when he thinks he is giving it a rich Dreſſing.

Coal-aſhes having a Salt alſo, though not ſo much as Wood-aſhes, muſt be kept dry in order to preſerve their Virtue; for if they lie expos'd to the Rains, they will be reduced to mere uſeleſs Matter: but it is found by Experience, that if theſe be moiſten'd by emptying the Pots upon them from Time to Time; as alſo by throwing upon them waſte Soap Suds, in which Cloths have been waſh'd, or other ſuch Liquors as have a Salt in them, they are enrich'd, and will go farther than alone.

The Aſhes made by burning Weeds, Bean-ſtalks, Stubble, and other Vegetable Matters, are very little different from the common Aſhes of the Hearth, where Wood is burnt, but they are ſomewhat lighter, and eaſily part with their Salt by the Rain. When they are burnt upon the Ground, they are alſo well ſcattered, and ſprinkled equally, which does not always happen with ſuch as are carried on in Loads.

To this Head are to be added Peat-aſhes, which are of a particular Kind in this Reſpect, that they are lighter and ſofter than all others: but in general they are of the ſame Virtue with the Aſhes of Vegetables; more like thoſe of Stubble, and other light Kinds, however than Wood-aſhes. All theſe give great Fertility both to Corn and Meadow Land; and the laſt nearer than any other, approach to that Kind which is made by burning the Surface of the Land, to be ſpoken of preſently. But there is ſtill this great Difference, that in the burning the Land the Soil is prepared to receive them.

The beſt Uſe of Wood-aſhes is the ſtrewing them by hand over Wheat Lands, in the very beginning of the Spring. This Purpoſe they anſwer beſt if they have been kept under Cover, and wetted gently with the emptying the Chamber Pots on them from Time to Time. The proper Quantity is about fifty Buſhels to an Acre; and as they came cheap enough where Wood is the Fuel, this is no great Matter.

The Farmers in Hertfordshire and Buckinghamshire, have found by repeated Experience, that theſe Aſhes anſwer the Purpoſe of their Soot Dreſſings perfectly well; they value the Diſcovery for its ſaving the Price of Soot: but the Farmers will value it on a double Account, where Soot is not to be had in Quantities, as is the Complaint in moſt Places in England. The Encreaſe this top Dreſſing of Aſhes cauſes to the Crop, is greater than they could conceive who have not ſeen it.

The Uſe of Wood-aſhes thus prepared, is not confined to Corn Lands, they are excellent alſo on Paſture Ground; but on this there muſt be a larger Allowance: fourſcore Buſhels is about the right Quantity to an Acre. And in this uſe they not only cauſe an early and plentiful Shoot of the Graſs, but they deſtroy thoſe Inſects which are apt to harbour about the Roots to the great Injury of the Land.

Coal-aſhes preſerved and wetted in the ſame Manner, anſwer excellently on Paſture Grounds, and fifty Buſhels of theſe will go as far as eighty of Wood. What I have ſeen from Experience is, that on Paſture Grounds the Wood-aſhes take a more immediate Effect, but that of the Coal-aſhes is more laſting. The firſt Year's Graſs will be more plentiful from the Wood-aſhes, but the Effect is leſs afterwards, whereas the Coal-aſhes continue their Efficacy four or five Years very well.

Coal-aſhes are alſo excellent for Clover, Saintfoine, and the other Graſſes of that Kind. The Way of uſing them is ſoon after the Depth of Winter, to ſprinkle them at the Rate of fifty Buſhel to the Acre, and the Rains waſhing them in they do excellent Service.

It is a Cuſtom in ſome Places alſo to ſpread Coal-aſhes on the young Wheat, but Wood-aſhes are beſt of all for this Purpoſe.

Where Peat-aſhes are to be had, they exceed every other Kind for the Clover and Saintfoine. But being light there requires a large Quantity of them.

Beſide theſe ſingle Uſes of Aſhes, they do excellently well in many Compoſts. Wood-aſhes are a very fine Mixture with Cow Dung: they alſo enrich the Heaps of Soil that are made from all Sorts of Refuſe and Dung thrown together. And Coal-aſhes are an excellent Addition to the Earth that is mix'd with Hens Dung, nothing ſo readily breaking the ſtringy Toughneſs of that rich, but untractable Manure.

Coal-aſhes agree excellently with a clayey Soil, and Wood-aſhes with the loamy and gravelly: but either may be us'd in the Place of the other without Damage in any Caſe; the only Difference will be, that there will not be quite ſo much Advantage where they are laid on inconſiderately; as where they are ſuited to the Soil.

CHAP. XXXIX.

Of Burnbaiting.

TO the Head of Improvements of Land by Aſhes, may be properly enough refer'd the great and valuable Practice of burning the Baite or Turf, called in ſome Places Burnbaiting, and in others Denſhiring of Land, from the Name of the County in which it was firſt a general Practice. Nevertheleſs it demands to be treated ſeparately, becauſe of the particular Method of doing it, and the great Advantage the Land receives from that Method of Management, and Application of the Aſhes.

Burnbaiting is perform'd by cutting off the Turf of the Ground, piling it up in Heaps to dry, and afterwards burning it to Aſhes; which Aſhes are ſpread over the naked Surface, and plow'd in. This is the Practice in general Terms. It had its Name Burnbaiting from Baite, an old ENGLISH Word for Turf. For the Sake of the practical Huſbandman I ſhall lay down ſome Inſtructions relating to the Manner of performing it, before I enter on its Advantages, which I hope to teach him not only to obtain but to preſerve. This laſt Article is a Secret yet unknown to all our Farmers.

In the firſt Place the cutting off the Turf, as it is univerſally done at this Time, will admit of great Improvement. The preſent Method is this.

A ſtout Labourer puſhes a Breaſt Plough before him by the Strength and Weight of his Body and Arms, at a ſmall Depth under the Turf. This is a plain and poorly contriv'd Inſtrument, conſiſting of a Kind of Share, with an Edge for cutting the Turf, a Handle, and a croſs Piece at Top. They pare off the Turf with this about an Inch thick, more or leſs, according to the Quantity of Roots, or other Vegetable Matter there is in it; for the more there is of this, the thicker the Turf is to be taken off. It is thus cut into Pieces of a Foot and half long, and nine or ten Inches broad, and turn'd that it may dry.

It is evident that a Plow with a proper Share, drawn by a Horſe, would perform this Buſineſs in a much quicker and more advantageous Manner. There is a very convenient Inſtrument for the Purpoſe, deſcrib'd in a late Treatiſe on this Subject, which though I have not ſeen us'd, yet is ſo plainly uſeful and fit for the Purpoſe, that I ſhall propoſe it to the Farmer's Conſideration.

A hollow Plowſhare riſing with a ſharp Edge in the middle, from the Point to the Top, and having a Fin both Ways, beginning at the Point and running back to the Share, muſt be fix'd to a light and ſtrong Piece of Aſh ſharpen'd forward, but left thick and ſtrong behind.

The Share ſhould be two Foot broad from Point to Point of the Fins behind; a Foot long; and a Foot high. To the End of the Aſh Pole muſt be faſten'd a ſtrong Piece of Wood nearly perpendicular, but hanging a little backward: this muſt be two Foot high, and on the Top muſt be a croſs Piece for faſtening the Harneſs of the Cattle. This is eaſily underſtood, and any Country Workman can execute it.

The Handles of the Plow, and the Earth Boards to turn the Turf, are to be fix'd alſo into this ſquare Head. The Inſtrument is then compleat, and every Plow Boy will be able to manage it properly with a little Inſtruction.

He muſt begin at the Edge of a Field, and as he goes on, one Turf will be turn'd toward the Fence, the other inward. When he returns he muſt direct the Plow juſt along the Edge of the laſt mention'd Turf, for it covers a Part of the Ground that is not cut up. This will be cut up at the Return, and turn'd over with the other.

In this Manner the whole Field is to be pared; and the Turf will then lie in long Pieces reaching from one Side to the other. There requires after this the cutting it into Lengths: but this muſt not be called an additional Trouble, the former having been ſo very trifling in Compariſon of what is commonly requiſite to that Purpoſe. The Gentleman who invented the Plow, has alſo contriv'd a very plain and ſimple Inſtrument for this Purpoſe.

A Roller is to be made of the Trunk of a ſound Tree, firm, large, and heavy. It is to be hoop'd round at every two Foot, and from the middle of each Hoop is to riſe all round a Blade ſix Inches deep, ſtout at the Bottom to ſupport it againſt bending, and ſharp at the Edge. The Roller thus arm'd, is to be drawn over the whole Field Croſs-ways; and its Weight preſſing the Edges all the Way down, the Turf will be cut through and through at every two Foot. By this Means the whole Surface will be cut into Turfs of two Foot long, and one broad, which is a very proper Size.

Having thus given a convenient and expeditious Method of cutting up the Turf, we are to proceed to the drying, piling, and burning of it: for howſoever plain and ſimple this Operation may ſeem according to the few Words in which the Writers on theſe Things have deſcribed it, a great Part of the Benefit the Far-

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mer is to reap from it, depends on a very critical Regard to every Part of the Proceſs.

If the Soil be light, and the Weather hot and fair, the Turf will dry with once raiſing up and turning: but if either its own Dampneſs, or the Wetneſs of the Seaſon prevent this, it muſt be piled together as hollow as may be, in little Heaps; where Paſſage being left between the Turfs for the Wind, they will quickly be dry'd. Sometimes juſt ſetting them on Edge againſt one another will anſwer the Purpoſe.

When they are dry enough for firing, the Turf will in ſome Places burn ſingly and of itſelf; in others it muſt be aſſiſted with more inflammable Materials. The Farmer may know whether he be to fire it alone, or to give it this Addition by obſerving its Nature as 'tis turn'd up.

When the Soil is very poor, the Turf thin, and few Roots among it, it will not do alone. On the other hand where the Soil has been better, the Turf cut deeper, and there is a great deal of Roots in it, and of Stalks, and dry Leaves upon it, 'twill burn alone, and he is to give it no Addition.

In the other Caſe he is to ſtrew a little dry Heath or dry Furzes under every Heap, and if it be very poor, and he make his Heaps large, he muſt mix ſome of the ſame dry and inflammable Materials among the ſeveral Turfs of every Heap.

'Tis beſt, however, to make the Heaps ſmall, whatever be the Soil, or the Condition of the Turf; for thus they always burn beſt, and being more numerous, they improve more of the Surface of the Ground in the Act of burning: for 'tis not only by Means of the Aſhes that barren Grounds thus treated are improv'd, the very heating of them by theſe ſeveral Fires tends to divide their Particles, and encreaſe the Fertility they are gaining.

Some make a great Art of raiſing theſe little Heaps of Turf for Burnbaiting, compoſing them of ten or a dozen Turfs each, which they twiſt curiouſly together, leaving a Hollow within; and Holes between in ſeveral Places, as if they ty'd them into Knots like Ribbands, or imitated the Flouriſhes of a Writing Maſter's Pen. They then draw in Pieces of Furze between the Holes, and fill the hollow Part with it. To this there is no Objection, but that it is a greal deal of needleſs Trouble.

A good Wheel-barrow Load of the Turf is ſufficient for each Heap, and if they are of the poor Kind, a little dry Furze ſhould be laid upon the Ground under and between them, this is all that is needful. The Labourer then is to ſet them up end-ways, and edge-ways, as looſe as he can; and when all the Heaps are thus rais'd, and have ſtood a Day or two for a farther drying, the Furze is to be ſet on Fire, and they will catch from it, and burn away ſufficiently for the Farmers Purpoſe.

Let us now examine the Matter of burning them: for on the doing this properly, as much at leaſt depends as on any Part of the Work. Many a Huſbandman after all his Toil and Expence, has loſt half, nay, two thirds of his Advantage from the ſingle Circumſtance of not regarding, or not knowing the proper Degree of burning.

Now in order to explain this it is to be obſerv'd, that Fire carries off all the efficacious Parts of moſt Subſtances; but this it does gradually; and the Progreſs may be ſeen. The Farmer wants to reduce this Turf to Aſhes; but as he wants theſe Aſhes to enrich his Land, he ſhould get them as full of Virtue as he can.

If a Plant of any Kind be put into the Fire, it burns away to Aſhes, but theſe Aſhes at different Times of the burning differ very much in Appearance, and alſo in their Qualities. When the Plant firſt falls into Aſhes, thoſe Aſhes are of a blackiſh grey; and as they continue in the Fire they become paler and paler, till they are at length perfectly white. While they are of a dark grey, they have a great deal of Taſte, but when they are burnt white, they are only a little brackiſh.

The Philoſophers and Chemiſts tell us, that this Colour is owing to the Oil of the Plant, as alſo the Taſte; and that this Oil, burning away, leaves the Aſhes pale, and of half their Virtue. Very likely this Account is true. The Colour and the Taſte muſt be owing to ſomething, and whatever that is, it burns away afterwards. Whether it be the Oil or not matters nothing.

We don't know what Principle it is in Aſhes that gives Fertility to the Ground; but whatever it be, 'tis beſt to preſerve it as entire as poſſible. Now let us apply this Reaſoning to the Huſbandman's Burnbaiting, and we ſhall ſoon ſee the Reſult of it, and what Practice it directs.

Let the Farmer mark the Courſe of the Operation in the burning of one of theſe Heaps of Turf. He will find, provided the Fire go on well, that at firſt all the Heap looks blackiſh and duſky; then the Turfs which compoſe it, after a Time, begin to crack and crumble to Pieces: a little while after this he will ſee them moulder into an Heap of rediſh or yellowiſh Aſhes, with ſeveral Lumps among them; and a while after this a great Part of the Lumps will moulder away, and the Aſhes, in moſt Parts, become of a pale grey; and in ſome Places whitiſh.

It is eaſy for him, from the before mentioned Directions, to know in which of all theſe States the Turf is fitteſt for his Purpoſe. While it is black and holds together, it is burnt but imperfectly; when it begins to crack and crumble to Pieces, it comes nearer to a Condition for his Service: but the true State in which it is to be uſed is, when 'tis moulder'd to Pieces, but yet retains a yellowiſh or rediſh Colour: the Aſhes are at this Time thoroughly made, and yet they retain their full Virtue. After this, every Minute that they continue on fire, they loſe ſome Part of their Goodneſs.

We now naturally are led to conſider the proper Degree of Fire, for the bringing the Turf to this State, with leaſt Loſs of the Virtue in burning.

All Violence of Heat waſtes the Virtue of the Turf, which the Farmer wiſhes to have remain in the Aſhes: therefore he is to contrive to burn them by a ſlow and mouldering Fire. For this Reaſon the leſs additional Fuel he uſes the better: and that there may be Occaſion for as little as

poſſible, he will do well to dry the Turf as perfectly as he can firſt. It is for this Reaſon alſo, principally, that the Aſhes made from rich Turf, are found better than thoſe from ſuch as is poorer, for the rich Kind conſumes by itſelf, and that ſlowly.

I have known a Farmer who thought he was doing his Buſineſs to great Perfection, in this Article, dry his Turf ſo well, and then put ſo large a Quantity of dry Furze under and between each Heap, that the whole Virtue of the Turf has been ſent into the Air, excepting what remains in all Aſhes. Every Heap has blaz'd away like a Bonfire, and the Aſhes have remain'd white, and in a Manner inſipid.

To preſerve the full Virtue of the Aſhes, a ſlow ſmothering Fire is beſt. And this the Farmer is alſo to recollect, that the Inſide of his Heaps will be always more burnt than the Outſide, ſo 'tis enough, in many Caſes, if the Outſide be well crack'd, and ready to break to Pieces with a ſmall Blow. In this, however, no general Rule can be given, for the Nature of the Turf differs ſo much, that ſome will hang together till ſtruck, when it is over-burnt, and other Kinds will break and fall in before they are half reduc'd to the proper State. I have taken the only general Method; that is, informing him of what is the right State of the burnt Turf, for giving its full Virtue. And his Eye muſt watch this, and take the proper Opportunities of continuing or ſtoping the Burning, when it is needful.

The Farmer may gueſs, by the Nature of the Turf, what Degree of Fire it will bear, and what Addition of Fuel it will want: this he is thoroughly to weigh before hand, for on this a great deal depends. The Practice ſucceeds beſt when the Hills burn juſt as long as they ſhould, and ſo may be left ſtanding whole upon the Ground; and this will depend upon the Quantity of Fuel, join'd to their own different Nature. If too much Fuel have been given them, as in the Caſe of the fooliſh Farmer before-mentioned, and they from thence continue burning within, after the very Outſide is done enough, then he is to break and ſpread them a little, ſo as to make them go out: but it is much beſt when they go out of themſelves, and remain properly calcin'd and whole: for when they are thus broke and ſcatter'd, if a windy Day come, half the Aſhes will be blown away.

We will ſuppoſe therefore, according to the Directions here laid down, the Heaps ſo well made, and the Fuel ſo juſtly proportioned to the Nature of the Turf, that the Hills are all ſufficiently burnt and ſtand entire.

In this Condition the Farmer is to leave them till thoroughly cold, and if that happen in any reaſonable Time, till there has been a good Shower or two of Rain; he is then to prepare for ſpreading of them: and for this Purpoſe he is to take the Advantage of a calm and ſtill Day.

He is to begin with paring the Surface of the Earth up to three or four Inches Depth all about each Hill, and then removing the Hill a little, he is to pare it ſomewhat deeper, juſt under its Place of ſtanding. Theſe Parings of the Ground are to be thrown upon the Hill, and all is to be broken and mix'd together.

It is proper to explain the Uſe of this Part of the Operation. I would have the Farmer receive nothing upon Tradition, but all from Reaſon. I have obſerved before, that not only the Aſhes of the Turf fertilize the Ground; but this very Act of burning; the real and actual Effect of the Fire does great Service to the Land, ſo far as it reaches. A greater Degree of Fire alters the very Quality of Earth, and renders it unfit for Vegetation, but Fire, in this Degree, only heats it enough to divide it, which is one great End of all Dreſſings whatſoever.

Now as the Earth that was under theſe Hills, and that juſt round about them, would be thus rendered more fruitful than that between one and another of them, at a ſomewhat greater Diſtance, the Land would afterwards be fruitful in Spots and Patches: or the Crop would be too rank in theſe Places, and ſtarved in others.

To prevent this, the Farmer is directed to pare away the Earth under and about each Hill; and mix it with the Aſhes of that Hill. By this Means the Quantity of theſe Aſhes will be encreaſed, and they, together with this Earth which is thus enriched beyond the reſt, will be regularly ſpread over the whole Field; and every Part of it will enjoy an equal and a great Degree of Fertility.

Some add Lime to the Aſhes, in the Quantity of about half a Peck to every Hill, ſuppoſing each Hill made of a ſingle Wheelbarrow full; or more, as the Hills are larger. They put this in under the Hill, or among the Aſhes; and don't ſtir it till Rains have come to ſlake it. This adds to the Fruitfulneſs that follows, but it is not needful; for there is enough without it: nay the Danger of a Piece of Land that has been well dreſs'd in this Manner is, that it ſhould be too rich, and make the Crop over rank. I therefore adviſe the Farmer to make no Uſe of Lime, or any other Addition to the Aſhes, except the Earth, par'd up as before; and he may be aſſur'd of ſufficient Encreaſe.

The beſt Seaſon for undertaking this Buſineſs is about the Middle of May, for at that Time the Surface of the Ground is generally in a good Condition for burning. The April Rains have made the Roots ſhoot out, and the enſuing Warmth has dry'd it. Beginning at this Seaſon alſo, he will have Time for waiting every Opportunity, to take Advantage of Weather, and all Accidents, and will have his Ground in thorough Order for his Seed.

After this burning and ſpreading the Aſhes, he has nothing to do but to plow the Land, and ſow it; and this plowing muſt be the ſlighteſt imaginable. He muſt go to no Depth, and only juſt turn in the Soil, with the Aſhes upon it, ſo as to mix all together, and then ſow his Corn.

Another Particular alſo is, that the Farmer here ſaves half the Expence of his Seed Corn. One half the Quantity that is allowed to other Lands, is ſufficient for theſe, after burnbaiting, and the Crop is very abundant. It is moſt profitable to ſow Wheat the firſt Year; and 'tis beſt to ſow it very late: the firſt Week in Novem-

BER is ſoon enough, and this Way it will flouriſh and yield a vaſt Abundance.

Few who have not ſeen the Effects of Burnbaiting, cou'd conceive how profitable a Method of Dreſſing it is. And what ſhould recommend it the more ſtrongly to general Conſideration, is, that it is not to be uſed on Lands that are good in themſelves, but on the very pooreſt and worſt, and never fails of Succeſs.

Burnbaiting ſhould never be practiſed on rich Soils at all; nor is it proper on the ſtony, gravelly, or chalky Kinds: or indeed for any Lands that have been kept long in Tillage. Every thing ſhould be apply'd to its right Purpoſe, in order to the yielding of its beſt Advantage; and the proper Uſe of this Method is, for poor, barren, ruſhy, and heathy Grounds, that have lain a long Time untill'd, and are of little or no Value.

I have given the Farmer at large, the whole Method of this excellent and uſeful Practice. He is inſtructed perfectly in the Art of obtaining, by this Means, an excellent Crop from the moſt worthleſs Land.

The Advantage is not confin'd to one Year; it will very well laſt three, and in thoſe it is eaſy to obtain, from ſuch a Piece of Ground, as much in clear Profit as would have purchas'd it at the full Value. The Huſbandman is content with this, and he leaves the Land as he found it: for the Effect of Burnbaiting does not laſt more than three Years; and at the End of that Time the Ground is left full as poor as it was before. This forced Fertility has indeed ſo thoroughly exhauſted its Strength, that it will not be fit to bear any thing afterwards, till it has had a Reſt of ten or a dozen Years.

But though the Farmer is content with this three Year's Profit, from his burnbaiting of Land, there is no Neceſſity that he ſhould be ſo, nor are his Profits confin'd to that Time, unleſs by his own Indolence. This is a Thing that has been mentioned before; and 'tis a Wonder the Farmers have not univerſally conſider'd its Importance.

Let them thoroughly underſtand this Matter. Burnbaiting, and dreſſing with Dung agree in this, that they both render Land fertile for three Years. The Difference between the two Methods is this. At the End of the three Years Fertility from Dung, the Land is ready to receive another Dreſſing; but in the burnbaiting Way it is not.

What then can be ſo plain, as that if it will not receive the common Dreſſings at the End of the three Years, they ſhould be offer'd to it in the mean Time. It will receive them if they be; and here lies all the Secret.

Dung raiſes but a moderate Fertility, and is uſed to Land that was not bad before. Burnbaiting is employ'd on Land that was good for nothing before; and it gives, the firſt Year, a prodigious Encreaſe. It might bear recruiting after this, exhauſted as it was; but after two Years more being exhauſted, without any Supply, it will not. It is then too much impoveriſh'd to receive Good from any thing, like Animals after too long an Hunger, that die when they have had Food.

Upon this reaſonable Plan I ſhall propoſe a Method to the Farmer, by which, having recover'd ſuch a Piece of Ground from Barrenneſs, he ſhall keep it good and fertile for ever after. It is no more than this.

After the firſt Crop is got in, let him prepare it for the ſecond by any common Manure. This being offer'd before it is quite exhauſted, will be readily received; and by this ſingle Act it will be brought to the Condition of other Land, and may be treated, in the ſame Manner, as a better Soil for ever, in the common Methods, and with the common Advantages.

If Marle can be had, and I have ſhewn already that Marle is to be found in moſt Places, where the Farmer will have the Induſtry to ſearch after it; let the recovered Land have a middling Quantity of Marle laid on it, between the firſt Crop and the ſecond Sowing. This will be extreamly worth the Farmer's while, for after this it will be at once in the Condition of other marled Lands; and being treated like them, will yield in the ſame Manner.

If Marle cannot be had, a common Dunging will do; or what is much better, a Compoſt made of Horſe Dung, Cow Dung, and River Mud. The Farmer may take his Time for getting this ready; and it will not fail to anſwer his largeſt Expectation.

I have thus ſhewn what vaſt Advantages ariſe from this Practice of Burnbaiting, and in what Manner they may be continued: I have obſerved that it is a Dreſſing only to be given to the worſt of Soils. But although theſe alone require it in the full Extent and Degree; yet there is no Reaſon others which do not want it ſo much, ſhould be wholly deny'd the Advantages of the Practice.

We ſee that Aſhes are an excellent Manure; and we ſee that the Heat which is given to the Earth, by the burning ſmall Quantities of vegetable Matter upon its Surface, is a vaſt Improver of its Fertility. Now Aſhes may be a very proper Manure for Lands that do not require abſolute and thorough Burnbaiting; and if we give them Heat at the ſame Time, it will certainly be better.

On this Principle the Farmer will do well, on many Occaſions, to make thoſe Aſhes upon the Land, with which he intends to manure it; and he will ſo have the Benefit alſo ariſing from this heating of the Ground. This Practice is already followed on many Occaſions, and I ſhall recommend it on ſome others. And as this does not require the abſolute burning of the Baite, or Turf itſelf, I ſhall diſtinguiſh theſe by the Name of Baſtard Burnbaiting.

CHAP. XL.

Of Baſtard Burnbaitings.

THESE Methods have been in Practice in many Places, and in all Ages, though not diſtinguiſhed by any particular Name. It might have been ſaid, and it has been ſaid by many, that the Practice of Burnbaiting is as old as any thing we know of Huſbandry; the Poet VIRGIL is quoted by every little Eſſayiſt in this Way, for

deſcribing it, and it might be added, that all the old Roman Writers on Country Affairs have named it. But if we take in theſe baſtard Burnbaitings, the Aſſertion is much more juſt, and the Practice may well be ſaid to have been not only very antient, but in a Manner univerſal. Some of theſe Writers ſpeak indeed of burning the Soil itſelf: but they all talk of firing its Produce upon it, ſuch as dry Stubble, Haulm, and the like; as alſo of burning other Matters upon it brought thither for that Purpoſe. Theſe Practices are what I call baſtard Burnbaitings, which Term comprehends the burning the Refuſe Product of the Land; or whatſoever is brought to it, and laid on it for that Purpoſe: in ſhort, the burning any Thing except the Turf, or upper Covering of the Land itſelf; which in true Burnbaiting is cut up for that Purpoſe.

We have ſeen that this Practice was very antient; and we find to this Day that it is beneficial. Aſhes are a good Manure; but they are of ten-fold Value when made upon the Land. Men ſeem to have been inſtructed in this Practice as it were by inſtinct, for they have fallen upon it in Places where they could not have been taught it by one another.

In all the Accounts of the Practices of the East Indies, we read that in Ceylon, they burn off the dry'd Stalks of their Harveſt to prepare the Land for a next Year's Crop: and thoſe who have given us the firſt Accounts of America, join in telling us that the Natives uſed always to ſpread dry Wood over their Lands, and ſet it on Fire by way of cultivating the Ground. The Aſhes fell pretty regularly this Way; and the Ground was well and uniformly heated by the Fire, ſo that it could not fail of yielding a good Crop; and this, as it was not ſo ſevere a Practice as burning the Turf, would not be of that ill Conſequence to impoveriſh the Land for future Years.

In Places where Wood is plentiful enough, there could not be a better Method than thus ſpreading dry ſmall Wood over a Stubble Field, and burning that and the Stubble together. Let us not be aſhamed to learn even from Savages, when their Practice is founded on Reaſon, and ſupported by Experience.

I ſhall conſider this general Practice of baſtard Burnbaiting under four Heads, as it regards. 1. The burning of Sedge on wet Lands. 2. The burning the Stubble upon Corn Fields. 3. The burning any waſte Product on Heaths and Commons; and, 4. The bringing on Materials to the Land, and burning them there.

The burning of Sedge on wet Lands is a very old Practice, and has always been a very ſucceſsful one. In theſe Places the Graſs is often ſhort and ſour, and there grows a Kind of low Flag; whoſe Leaves take up more Room than all the Graſs. Theſe are uſually yellow, and look in a decay'd State; and in October or thereabouts, they become dry and ſtrawy. They then cover the Ground ſo, that there is ſcarce any Graſs to be ſeen, and they are dry enough to take Fire.

In this Caſe the Farmer is to take the Advantage of a very dry and moderately windy Day, and to ſet Fire to a whole Edge of the Field, that the Flame may be carried before the Wind. The whole Ground will be cover'd with Flame in a few Minutes, and ſoon after with a Kind of light black Aſhes. He is now to wait for the firſt Shower to damp them a little, and immediately upon this to ſow the whole Ground thick with Hay Seed.

Very often it happens that the Winds take off the whole Quantity of the Aſhes from the Ground, but even then the Advantage is not loſt, for the Heat ariſing from the burning, has killed the Roots of theſe Flags that lie juſt at the Surface, and has prepared the Ground to receive the Seed, which ſoon takes Root, and overpowers any other Growth, ſo that in Spring it ſhoots up at once, and grows immoderately. There never fails to be a very fine Swarth from this Practice, however contrary the Seaſon may have been; but if a little Rain have fallen, and the Aſhes are well waſh'd in with the Seed, the ſudden Shoot is ſurprizing; and the Weeds never recover themſelves.

In other Places of the Fen Lands where the Ground is ſpungy, and cover'd with Ruſhes, they turn up the Turf with a Breaſt Plow, and burn it on the Soil, afterwards ſowing Hay Seed inſtead of Corn. This is abſolute Burnbaiting, only as Graſs does not exhauſt Land like Corn, it has not the Diſadvantage of impoveriſhing it in that Manner for many Years after. This will continue good Paſture Ground a great while without any other Care.

This is a needful Practice in ſuch Grounds, becauſe their Wetneſs is not to be corrected by a mere burning of the Sedge; and Ruſhes are too firmly rooted to be deſtroy'd by that ſlight Method: but in the Iſle of Ely where this light Flag over-runs the Surface, I have ſeen the Practice of firing it without ſtiring the Ground, uſed to very great Advantage; and though begun there but a few Years ago, and only in one particular Place, it is becoming univerſal. The Advantage procured the other Way is greater, but this is eaſy, and it ſatisfies the Farmer.

The burning Stubble upon the Fields is an old and a common Practice, and though the Aſhes made this Way are light, and but a ſmall Quantity, yet the Heat that is thus given to the Ground, makes ſuch a Dreſſing better than the laying on four Times the Quantity of the beſt Aſhes brought from elſewhere.

Experience ſhews, that this Practice of burning the Stubble ſucceeds excellently upon thoſe Lands that are uſed to feed the Straw and Leaf, and ſtarve the Ear. The Farmer frequently finds Lands that yield a full Stalk, and a poor Ear; and others that lengthen and fill the Ear, while the Stalk is ſhort. He cannot tell the Reaſon of this, nor perhaps the beſt Philoſopher for him; but he may learn from Experience, that the burning of Stubble upon the worſer of theſe Lands, brings them into the Condition and Nature of the better.

When the Farmer intends to burn his Stubble, the firſt Thing he does ſhould be to plow up the Land under the Hedges; for it has often happen'd, that by the Wind the Flame has been driven to the Hedge, and catching hold of decay'd

cay'd Branches, has done vaſt Miſchief.

Although I have not recommended the Uſe of Lime with the Aſhes made by a perfect and right Burnbaiting, yet for this Purpoſe they are excellent, and a ſprinkling of Lime thrown among the Aſhes all over the Field, and the whole plow'd in after it has lain to ſlake with two or three Showers, is a prodigiouſly rich Manure. I have experimentally known ſo much of the Advantage of this Practice, that I ſtrongly recommend it to the Farmer.

The Benefit of burning the waſte and uſeleſs Product upon barren Commons, even without paring off the Turf for that Purpoſe, is not ſufficiently known. The Way is to ſtub up the Broom, Heath, or other waſte Matter, and pile it in little Heaps, throwing over it what Earth has been rais'd in the getting at the Roots: theſe Heaps being all prepared, are to be ſet on Fire in a ſtill Day, and left to burn away to Aſhes, which they do preſently. The Earth that is thrown upon them is well calcin'd by their burning, and though perhaps reduced to a State in which it would not be fit ſingly for the Growth of Plants, it becomes an excellent Manure.

Nothing need be done to theſe Parcels of Aſhes, and calcin'd Earth, till they have lain to be drench'd a little by the Wet. They naturally fall in tolerably regular Heaps. When they have been well wetted, the Huſbandman is to take Advantage of a dry and ſtill Day to ſpread them regularly over the Land; and then the ſooner they are plow'd in the better.

Lime is an excellent Addition to the mix'd Aſhes made by this Kind of Burnbaiting, but it has not been mention'd in the general Account, becauſe Lime is a Manure that does not agree with every Soil. The Ground in theſe heathy and broomy Commons is often clayey; and as often light and hollow. When it is clayey, the Method juſt now deſcrib'd is to be uſed without farther Addition, for Lime will never do well upon Clay: but when the Soil is light and hollow, then let the Farmer lay upon every Heap of Aſhes, half a Buſhel of good Stone Lime, mixing it a little with the Aſhes: and then let him leave all as before for the Rains to damp the Aſhes, and at the ſame Time ſlake the Lime: after which let him ſpread them as before directed, and plow all in.

A great deal in all theſe Improvements is left, and muſt be, to the Diſcretion of the Farmer: for if he do not ſuit his Manure, and his Manner of uſing it to the particular Soil he has to work upon, he does nothing even with the beſt Materials, and the moſt indefatigable Induſtry.

In all the Caſes hitherto mention'd, this laſt alone excepted, theſe baſtard Burnbaitings are only a ſlight Imitation of the real and thorough Burnbaiting, and though they may to ſave Expence and Trouble, or to ſuit particular Circumſtances, be uſed inſtead of the perfect Method, they never ſucceed ſo well. There are Caſes where the right Burnbaiting is not proper, as has been ſaid already; but wherever it is, though the Coſt be greater than that of theſe ſlighter Methods, the Conſequence makes amends. The laſt mention'd Caſe I particularly excepted; for the Lime here is a very material Part of the Dreſſing.

When this Method has been carefully executed upon a right Kind of Soil, though ever ſo barren, the Effect of the Aſhes, the calcin'd Earth, and the Lime, together with that of the Warmth given to the Earth itſelf about the Heaps is ſuch, that ſcarce any other Method whatſoever ſucceeds more perfectly, or more happily for the Farmer.

This is an eaſy and a cheap Practice. It is done with little Labour, and if the Lime be burnt by the Farmer himſelf for his own Uſe, as before directed, with very little Charge; it takes Effect upon the moſt barren Soils; nay, it is beſt of all ſuited to the very meaneſt and worſt Lands: what would the conſiderate Huſbandman wiſh more? or why ſhould not every Land Owner who has ſuch Grounds in his Poſſeſſion, order it immediately into Practice. He need not make the leaſt doubt whatſoever of a great Return.

In the laſt Place I am to mention that Kind of baſtard Burnbaiting which is perform'd by bringing Sticks, Stubble, Haulm, and other waſte Stuff upon the Ground, and burning it to Aſhes. Many have ſuppoſed that this Practice did no more Service, or was in effect nothing more than the Dreſſing the Land with Wood Aſhes, bought and brought on for that Purpoſe: ſome have ventur'd to deliver as much in print, but they are greatly miſtaken. It has been obſerv'd already, that the heating the Earth in ſuch a Degree as is done by the making ſmall Fires upon it, is of itſelf a great Aſſiſtant to its Fruitfulneſs; and this makes a very great Difference between one and the other of theſe two Practices. In this Matter the Savages of AMERICA are better Directors to the ENGLISH Farmer than theſe Writers. They dreſs their Land with Aſhes, but, as before obſerv'd, 'tis always with Aſhes made upon the Spot, ſo that the Land has the Advantage of the Heat as well as of the Aſhes.

If any one can doubt whether there be really this good Quality in Heat, for giving Fertility to Land, let him obſerve the Effects of theſe two laſt mention'd imperfect Burnbaitings. In the others, Care is taken to mix the more improv'd Part of the Soil with the leſs, and conſequently all is equally fertile. But in theſe two laſt the Aſhes alone, or mix'd with Lime, are ſprinkled and plowed in, but nothing elſe is done. Now let the Crop upon either of theſe Lands be regarded attentively, and the Obſerver will find, that although the whole Field is fertile, yet there are here and there round Spots on which the Corn is fairer and finer than in the reſt. And when he examines the Matter ſtrictly, he will find that theſe are the Spots on which the ſeveral Heaps were burnt.

The Aſhes made by that burning have been carefully ſpread; and they have therefore not been more abundant in one Place than another: to what then is this particular Fertility of theſe Spots

Spots owing? the Anſwer is very plain, for there is but one Thing to which it could be owing; it is to the heating of the Ground under and about thoſe Heaps.

Let this inſtruct every Farmer who intends to dreſs his Corn Land with Aſhes, to burn the Materials upon the Place. Practice ſhews, that the lighter theſe Materials are, the more Fertility there is in the Aſhes. Now the Stuff burnt on theſe Occaſions is much lighter than the common Billets uſed for firing. This therefore is ſome Advantage, but the heating of the Ground is a much greater.

Thus although the perfect and thorough Method of Burnbaiting of Lands have on many Occaſions a much greater Effect than any of theſe ſuperficial and imperfect Imitations of it; yet the Farmer, after this Account of their particular Uſes and Advantages, will not think the Time ill employ'd, that he has ſpent in reading this brief Account of them, ſeverally, and diſtinctively laid before him.

The perfect Burnbaiting is proper only for certain Soils, and on certain Occaſions; but the Benefit ariſing from it is ſo great, that it will grieve a conſiderate Perſon, that he muſt loſe it becauſe the Circumſtances where he would wiſh to employ it, do not perfectly ſuit. To remedy this Misfortune, theſe ſeveral different ſlighter Imitations of that excellent Practice have been laid down.

The Farmer will ſee according to theſe ſeveral Deſcriptions, in what Manner, and on what Occaſions he is to employ them: and he may have this Comfort in the Uſe of them, that when he can only employ the ſlighter Kinds, his Lands have not Occaſion for the more perfect: and that, if though additional Encreaſe be leſs, the Expence alſo is leſs which procures it.

End of the Second Book.

A COMPLEAT BODY OF HUSBANDRY.

BOOK III.

Of the Improvements of Land by Incloſing and Draining; and of the ſeveral Kinds of Fences.

The INTRODUCTION.

Of Incloſure in general.

HAVING given the Huſbandman Inſtructions for underſtanding the Nature of his Soil; and for the meliorating and enriching it by the ſeveral Kinds of Manures; we are to advance to an Improvement of another Species; that which is to be made by Incloſure: which is not only great in itſelf, but is the beſt of all Aſſiſtances to the ſeveral other Kinds.

If it be ſaid, this in the general reſpects the Land Owner, rather than the Farmer who rents his Ground, we anſwer, That it is the Purpoſe and Deſign of this Work to inſtruct both: nor is it poſſible to form a Wiſh more advantageous to this Kingdom, than that the Gentlemen who are Poſſeſſors of Land, would join with the Huſbandman who commonly rents it, in this great Undertaking of Improvement.

But though incloſing in the firſt Inſtance may more properly be ſaid to regard the Landlord, yet in general it is an Article of great Concern to the Farmer. He is to keep up the Fences, and this at a conſiderable Charge. We ſhall therefore in a great Part of this Portion of our Work, labour alſo for his Advantage.

The Benefit of incloſing is obvious: 'tis indeed ſo evident, that thoſe who have for other

Reaſons written againſt the Practice, have been oblig'd to allow it the greateſt of all others, in the Improvement of particular Eſtates. We ſee on all Occaſions, that it encreaſes the Rent of Land in a very important Manner, bringing it at once to three, four, and ſometimes to ten Times its former Price.

Every particular Inſtance that I have ever ſeen or read of it, has join'd to enforce this general Account, for no Attempt in that Way can be named, that has not enrich'd the Owner. One would wonder, that a Thing ſo plainly beneficial, is not more univerſally practiſed.

Private Eſtates lie differently, and ſome contain more, ſome leſs of enclos'd, and of common Field Land. To judge of the Quantity enclos'd, and Quantity open, we are to look into the general. England is ſuppos'd to contain more than forty Millions of Acres; and 'tis computed that about one third Part of our Land is open Field. Upon this Suppoſition, which probably is near the Truth, for 'tis hard to come at it exactly; the Rent of more than fourteen Millions of Acres of Land in this Kingdom, may be raiſed to three, four, or many more Times its Value, by this ſingle Act of Incloſure.

This is a vaſt Account; and as almoſt every private Eſtate muſt be more or leſs concern'd in it, as a Part of the general Quantity, it becomes every Land Owner to conſider it deeply, in Proportion as he happens to be more or leſs intereſted. If he can have a Method pointed out to him, this Way of trebling or more, the Rent of ſome conſiderable Part of his Eſtate without Injury to any Perſon, ſurely it is worth his while to make the Attempt: eſpecially when it is ſo eaſy, and the Event ſo certain.

It has been ſaid by ſome, that Incloſures in this general Senſe, are againſt the Laws of God; and others have imagin'd they tend to oppreſs the poor; but theſe are Points that have been debated by many as their Importance demands. It has been made appear, that if every Acre of Land in this Kingdom were incloſed, it would be for the Advantage of the poor as well as rich. However, let Humanity in this Caſe be the Guide to every particular Perſon; becauſe what might upon the whole be a publick Benefit, may in ſome Caſes be a private Crime.

Let every Land Owner who is about to incloſe, conſider what will be the Conſequences in that particular Place: if it appear that many are to be injur'd by that which ſingly enriches him, let him decline the Undertaking: but theſe certainly are Circumſtances that cannot often happen.

CHAP. I.

Of the great Advantages of Incloſure.

I Have obſerv'd, that every Land Owner is more or leſs concern'd in this great Article of Improvement by Incloſure, in Proportion as more or leſs of his Land lies open; and I am aware it will be objected by many, who ſee the Advantages of that Practice very plainly, and have Land enough to improve by it, that in ſome Places the Soil is ſo bad, that it is not worth the Expence; and in others, that as the Lands have lain open from Time immemorial, the common People will not ſuffer it.

The Thing is of ſo much Conſequence, that every Objection againſt it ought to be anſwer'd. Thoſe which are made againſt the general Practice, have been already taken Notice of in the laſt Chapter; it is fit theſe ſhould be conſider'd as ſeriouſly, which regard every particular Attempt. Such a general Practice muſt be begun and carried on by Particulars; therefore they ought in all Reſpects to be ſatisfied where there is Ground to do it.

As to the firſt Objection, the Barrenneſs of the Ground: it is a very common and a very natural one: but all that is common and natural is not juſt. A great deal of Land is called barren, that would have a better Character under good Management. I will be bold to ſay from what I have ſeen, that nine-tenths of the Land in England that is called ſo, and left waſte at preſent, might be cultivated by induſtrious and intelligent Perſons, with great Profit.

It has been ſaid, in the Beginning of this Treatiſe, that every thing may be cultivated except naked Rock, and of that we have very little in this Kingdom. What has been there advanced is founded on Experience; and he who ſhall think it worth while to undertake the Improvement of the worſt Soils heartily, and begin with Incloſure, will give his Deſcendants cauſe to bleſs thoſe who ſet him on the Trial.

To encourage the Perſon who has barren Lands to attempt this, let us turn his Eye upon thoſe Tracts of Sand which cover ſome Parts of Suffolk, and the Edge of Norfolk; nothing that can be call'd a Soil, can be ſo barren as theſe, and yet they are cultivated, where People have Spirit and Reſolution, to a very fair Advantage.

In ſome of theſe Places the Surface of the Ground is a naked looſe Sand. There is no Mixture of Earth, or any thing elſe, to be ſeen in it; and no Weed, not ſo much as a Blade of Graſs is to be found upon it for Miles together. In the open Places it is moveable, like the Sands of Arabia, by the Winds; and is carried in great Quantities, like Waves of Water, before every hard Gale. No wonder nothing grows upon it; for this ſingle Circumſtance muſt prevent that entirely.

Nothing can be pretended to be more barren than this, except bare Rock; yet they find the Way to render it fertile. They ſow Hay Seed upon it in a calm Day, and immediately cover this with Furze-Buſhes, which they ſtake down upon it, to prevent their being blown off. The Covering not only keeps the Sand ſteady, but light as it is, it produces ſome Moiſture, as there will be on all Ground that is cover'd. This ſoftens the Seed, and it ſoon ſhoots. After a little Time the Roots ſpread, and intangle in their natural Way, and hold down both themſelves and the Soil, till it is cover'd with a tolerable Sward, and fix'd from that Motion it had before.

This is done, and tolerable Paſture is produced out of the moſt abſolute Waſte. We propoſe

propoſe thoſe Things which are done on ſuch Occaſions, not only for the Farmer's or Land-owner's Imitation, but for his Improvement. From this the Owner may ſee that he needs not ſuppoſe any Part of his Eſtate barren, from this which is the worſt Fault it poſſibly can have; and we ſhall ſhew how all others may be remedied, and how moſt of them are remedied in one Place or other.

He who undertakes the Study and Practice of Huſbandry, upon the Plan of this Work, will not ſtop his Endeavours at what he has ſeen done by others. We have already acquainted him what may be done in the Improvement of Soils, and for what they are ſuited; upon theſe Principles he will turn the Suffolk Method to a much greater Account.

Let him who has ſuch a Piece of Ground, begin with it as they do there, but let him not ſtop where they do. In the firſt Place, when he has thus cover'd the Sand with a Sward, let him encloſe it with a thick Hedge, to prevent the Sand from the neighbouring Ground being driven upon his Crop, and burying it. He will thus ſecure what he has got, and make it a laſting Advantage.

Again let him conſider, that when he has a Piece of ſandy Ground encloſed, Graſs is not the only Produce he may make it yield. Carrats thrive better in this, than any other Soil whatever; and Turneps will ſucceed in it very well.

Here are two Articles by which he may very well pay the Expence of his Incloſure, in a few Years, and all that Time be improving the Land. But that is not all.

We have ſhewn, in the preceeding Part of this Work, in what Manner ſandy Soils, even the worſt of them, are to be brought into a Condition to bear any Kind of Corn or any Crop whatſoever, to great Profit, and with great Certainty. Now what will improve and enrich a ſandy Soil, which has ſome Mixture of Earth, will, in a fuller Uſe, give Fruitfulneſs to the bare Sand itſelf; this follows from the Nature of the Practice itſelf, which conſiſts chiefly in adding ſuch Matters as alter the very Nature of the Ground.

Now upon this Principle, as ſoon as the Land Owner has been at the Expence of an Incloſure upon the moſt barren Sand imaginable, let him not depend upon the Hay that it will yield, which is little, or upon the Paſturage it will afford to Cattle, which, though very ſweet is alſo moderate in Quantity; nor let him fix himſelf to any one Growth.

Let him begin to improve it upon the Plan, and by the Methods, laid down in our firſt Book, and fifteenth Chapter, for the Improvement of a ſandy Soil; and when he has by a careful Management brought it to the Condition of a better Ground, let him ſow it in the uſual Manner; and he will reap Wheat, Barley, Rye, Beans and Peas from it, to the Aſtoniſhment of his Neighbours, and perhaps to their Imitation.

This is not to be undertaken in ſuch Places, but by beginning with Incloſure, the Expence of which will be ſomething; but a few Crops will repay it; and the Land will be render'd valuable for ever.

If this may be done by the Aſſiſtance of Incloſures in the worſt Soils, for none can be more barren than what has been here propoſed for a Trial; it is very evident that upon a better Land, the Advantage will be greater. What was propoſed here was to anſwer the Objection, That ſome Parts of an Eſtate may be barren, and not worth incloſing; which we hope is thus ſhewn to be altogether a Miſtake. Certainly it is ſuch, and every one who ſhall be induced to make the Trial, will find it beneficial.

Without Incloſures, this is in ſuch Soils altogether impracticable; and indeed the Benefits of a perfect and expenſive Dreſſing of Land, are never thoroughly aſſured to him who is at the Expences and Trouble, but in Lands that are incloſed. This therefore is a great and a reaſonable Motive for extending the Practice.

As to the Oppoſition of the common People, which is the ſecond Objection, that may alſo be anſwer'd with Truth and Candour. Where the incloſing will be a real Injury to the Poor, the Landlord has been already adviſed to let it alone; but this can happen only in a few Inſtances. In all others, where their Oppoſition ariſes from Obſtinacy and Folly, let him guard againſt its Effects by ſetting out in a proper Manner.

Dry Hedges are eaſily laid flat, and Quick-ſets pulled up, and this He may always expect will be done who oppoſes Prejudice, let him therefore make his Fence by a Ditch ſeven Foot deep, and as many wide. They will be ready to throw the Earth into this again, and fill it up: 'tis true, but he may prevent that in Time, by ſpreading the Earth as it is thrown out upon his Land. This will ſerve as a Manure to the Soil, and though Paſſion might have led the Mob to throw in the Bank if it had been left, they will not be at the Pains of digging for that Purpoſe: they will not have Opportunities of doing this in ſecret, and they will not dare to do it openly.

Thus will the Effects of Malice be prevented; and the Benefit of the Expence and Labour aſſured to the Proprietor. They will very ſoon be repaid by the Produce; and if it ſo happen that Water can be got into the Ditch, the better. After a few Years, Things will be left quiet, for Cuſtom will prevail one Way as well as another, and a Quick may be planted, which will thrive leiſurely, and enſure all the Advantages of a regular Incloſure.

CHAP. II.

Of the more particular Benefits of Incloſure; and the other Objections made againſt it.

THE Improvements which have been mention'd in the preceeding Part of this Work, are very numerous, as well as great. The leaſt and ſlighteſt of them will very well anſwer the Expence of the moſt coſtly Kind of Incloſure, in the Compaſs of a few Years; and there is no Kind of Land whatſoever, but will by means of Incloſure, be render'd capable of one or other of thoſe Improvements.

This is a certain and unqueſtionable Truth; and this at once ſets the Buſineſs of Incloſure upon its proper Footing, ſhewing every Land Owner, in every Circumſtance and Situation whatſoever, that it is to his Intereſt to incloſe. Things plain in themſelves become yet plainer by Inſtances; and every one of theſe that can be produced, will ſerve to ſtrengthen the Cauſe in Favour of this Practice: it is a very bold Thing to advance, but it is as certainly a Truth, as ſaid before, no Perſon ever ſet about Incloſure upon proper Knowledge, and with due Induſtry, who did not vaſtly profit by it.

This Practice not only makes Land yield greatly more; but it enſures to the Owner his Property and all its Advantages, as it prevents thoſe innumerable Treſpaſſes and Injuries which are continually happening in common Lands.

It gives a Man Liberty alſo of making whatſoever Alterations or Improvements he ſhall chooſe, upon his own Land; he may plant and ſow what he pleaſes, and in whatever Manner he pleaſes, upon his Ground, when thus ſeparated from the common Quantity; which he cannot do without a thouſand Inſults, Interruptions, and Inconveniences, from the Malice, Envy, or Folly of his Neighbours, while it lies open.

Theſe are not imaginary Advantages: all Counties, and all Times, have allowed them. We read in the antient Books that mention Huſbandry, of incloſing as the next Thing to plowing; often, in more improved Trimes, as prior to it: and in all known Countries, from the earlieſt Time to the preſent, incloſed Lands have been held more valuable than the open.

Beſide the political Advantages of Incloſure, in aſcertaining a Man's Property, and ſecuring to him the Fruits of his Induſtry uninterrupted, there are ſeveral that may be called natural. I have already mentioned the Uſe of Hedges in thoſe ſandy Weilds of Suffolk, to keep off Loads of the looſe Covering of the barren Parts, from overwhelming the fruitful: but in all Places, in the beſt as well as worſt Counties, they are of great Service to the Crop, of whatſoever Kind. They defend the Crop from the Fury of the Winds, and, in a great Degree, from thoſe cold and nipping Blaſts which are ſo miſchievous in the early Part of the Spring. An incloſed Piece of Land is always quieter and warmer than a Piece in an open Field of the ſame Soil and Condition. This is very obvious to Reaſon, and is confirmed by Experience.

Incloſure preſerves, in a great Degree, the natural Heart of the Land, and that Richneſs which may be added to it by proper Manures. For it is found that the ſame Quantity of Manure will do twice the Service upon a quiet, warm, and ſheltered Cloſe, than it will upon an equal Quantity in an open Field, where it is liable to all Injuries. It is certain and well known, that an incloſed Land yields a much larger Crop of any Kind of Corn, from the ſame Seed and the ſame Dreſſing, than it will in an open Field: And as to the Graſs for Paſturage or Hay, there is no Compariſon between the Quantity growing on incloſed and common Lands. The Hedges alſo which make the Incloſure, if rightly managed, as we ſhall direct at large in the ſucceeding Chapters, are, in themſelves, a great Advantage and Profit. They ſerve for a Shelter to the Cattle that feed in thoſe Fields; and they ſupply the Farmer with Wood for all his neceſſary Purpoſes; and may be made in many Places to yield alſo valuable Fruit.

Theſe added to the many other Benefits ariſing from Encloſure, already mentioned, we may reaſonably hope will lead all to a due Senſe of the Importance of this great Article in the Improvement of Land. Nothing more is wanting, certainly, to convert the naked and ſtarved Parts of Wiltshire, Hampshire, and ſome of our other Counties that might be named, into the ſame Condition with the moſt rich and improved Parts of Buckinghamshire, and Hertfordshire; and to make the common People of one as happy as thoſe of the other. For whatever Pretences may be made of the Oppreſſion of the Poor, by the encloſing of Lands, this is certain, that they no where are ſo happy as where the Land, in general, is under Incloſure, and no where ſo miſerable, poor, ragged, and idle, as in thoſe Places where moſt of the Land lies in common.

All was once open, and the civilizing of People, and improving Lands by Incloſure, here came together. Thoſe who firſt ſettle in a Country find it all open. They, by Degrees, appropriate and incloſe: and why ſhould not that which is found ſo beneficial in the firſt Steps to improving a Country, be carried throughout every Part?

Certainly every Man would wiſh, and muſt naturally deſire, to have that which is his own entirely his own: and this can only be by Incloſure. That Land cannot be perfectly a Man's own, which is not entirely in his Power. And that is not ſo in his Power which he cannot manage as he pleaſes, and cultivate when, how, and in what Manner he pleaſes. How can that be entirely a Man's own, where the Profits of his Labour and Expence are not aſſur'd to him; where every ſtray Beaſt from the Highways and Commons, may walk in and tread down his Crop: nor can that Land be ſaid to be perfectly under his own Management, which he is obliged to ſow and reap at the Time others do, whether he will or not; and to keep Time with them in all other Particulars, when he knows how, by another Conduct, to have greater Profits.

That what is urged here in Favour of Incloſure, is not from Fancy or Prejudice of Opinion, is evident from what we ſee daily of the Effects and Conſequences of that Practice. We may eaſily direct our Eyes to Places where, in the Memory of ourſelves or our Fathers, Incloſures have been made from the common Fields. Let us fairly examine together the Condition of what is incloſed, and what lies common. The Land is the ſame, an Hedge only parts it; yet we find univerſally, that the Crop is vaſtly greater in the Incloſure, than in the common Fields: nor can there be any Cavil juſtly rais'd againſt the Concluſion from this, by alledging that more is beſtowed, perhaps, in dreſſing the incloſed Piece of Ground. 'Tis plain, by Peoples continuing to dreſs it at ſuch Expence, that the Profit anſwers. But the general and unanſwerable Argument is, that

that ſuch incloſed Lands are of more Value than equal Quantities upon the common Field. The Advantages of the Crop ſoon pay the Expence of making the Incloſure; and the Value of the Land is made much greater for ever. This is ſo plain an Argument that it admits no Diſpute.

We ſee vaſt Quantities of Land lie open in many Places, where it is of very little Value: We have ſeen, from Time to Time, Parcels taken from this and incloſed, which, upon due Dreſſings, have, in a few Years, paid back all the Expence of Incloſing and Improvement. Can there be any Reaſon aſſign'd why this ſhould not be done every where.

The Reaſons that have been pretended againſt it are either falſe or frivolous. Many of them have no Foundation in Fact; and others which are true, and are a general Grievance, may be eaſily removed.

In the firſt Place, it is not true that the Poor would be injured by a general Incloſure of all common and waſte Land. If there be particular Inſtances in which they would ſuffer, theſe ſhould be particularly conſidered, and Amends made to the Sufferers. In general the Advantage that a poor Man has by keeping two or three ſad Creatures of Cattle, of any Kind, upon the common Land, are not at all equal to what he and his Family would find, by being ſure to know where to get conſtant Employment as Labourers. This Privilege is indeed a Source of Idleneſs: and that can never be for private nor publick Advantage.

Upon the Edges of all great Commons we ſee a miſerable Set of Cottagers. Hunger is in their Faces, and Miſery upon their Backs: they idle away their Time in tending their own and other People's Cattle; and breed their Children to this poor Employment. The Profits of this are not at all comparable to what they would have from the common Price of their Labour and their Childrens. And if theſe Lands were incloſed, they would be at once compelled to Induſtry; and always found in Employment.

The great Number of Claims and Titles for almoſt every Piece of common Field and waſte Land in this Kingdom, is indeed likely to be always, as it has been often, an Hindrance to this great Improvement by Incloſure. Among theſe ſeveral People one Man is obſtinate, and will not comply; another is under Age and cannot: Theſe are real Objections, but they are eaſily removed.

Is what has been ſaid upon this Subject true or falſe? certainly it is true! being true, is it not ſufficient Proof of the general and univerſal Benefit of Incloſure? if ſo, why ſhould not a Power be allowed to the Majority of Proprietors, by Parliament, as in other Caſes, to which the few who are fooliſh and obſtinate, muſt ſubmit: and in virtue of which, a Liberty ſhould be given to ſome to treat for Minors; and in all particular Caſes Proviſion made for thoſe who ſhall fairly ſhew themſelves to be aggrieved.

This appears to be a reaſonable Plan: and the Conſequences of it are certain. They are a great Addition to the Value of Land; and a conſtant Employment for the Poor and Induſtrious. The Highways, which are at preſent ſo wide in theſe open Fields, and deſtroy ſo large Quantity of the Land, might be reduced there as well as in other Places; and no Prejudice or Inconvenience to any could ariſe from it there, any more than elſewhere. A great deal of Land would be then recovered from the moſt needleſs Waſte imaginable; and its Value would be made much greater by the ſame Practice.

It is not only certain that incloſing Land any way is an Advantage in every Place, but 'tis equally true, and is ſupported by the ſame Experience, that the ſmaller the Incloſures are ſeverally made, the greater is the Improvement. This is conformable to Reaſon; for Incloſures of a large Extent are leſs ſheltered by their Hedges, and have leſs of all the other Benefits of Incloſure, as they approach nearer to the Nature of common Fields; the Borders of all which are terminated by Hedges ſomewhere. And, on the contrary, the more of theſe Incloſures are made, and the ſmaller the Parcels of Land contained within them, in the greater Degree it has the Benefit of all that Practice; and, accordingly, the larger Returns it is conſtantly found to make, whether Corn or Paſturage.

The encreaſed Value of Land by this Practice, always keeps Pace exactly with theſe Advantages, the ſame Quantity of Land, upon the ſame Soil, will always let for a larger Sum if there be many, than it will if there be few Incloſures; that is, it will fetch the more Rent, the more Parcels it is divided into. Objections might be ſtarted againſt this general Account, from particular Inſtances, but they will be conſider'd ſeverally hereafter: this is ſaid generally; and it has fewer Exceptions than almoſt any other general Rule; though, from its extenſive Compaſs, it cannot but be liable to ſome.

In good Meadow Land there is ſometimes a Loſs by having too many Hedges, by the Quantity of Graſs they ſpoil by their Shade, and their Drippings; but even this Diſadvantage is owing to the Want of due Knowledge in the Art of Fencing. We ſhall ſhew hereafter, that even in theſe Caſes, if proper Trees are planted, their Produce will be worth more than the Graſs they injure.

Objections have alſo been ſtarted againſt Incloſure in Corn Lands, from that common Opinion that Wheat, in incloſed Lands, is more ſubject to Blaſts and Mildew than in the open Fields. Of this we ſhall treat at large hereafter, when we come to ſpeak of the Diſtemperatures of Corn. For the preſent it is ſufficient to ſay, that theſe Accidents are not the Effects of Incloſure, although, perhaps, they are more frequent in Incloſures, than in open Fields. We ſhall, hereafter, ſhew their Nature and their Cauſe; and propoſe ſuch Methods as, with due Obſervance, will not fail to preſerve a Crop from them. In this Place it need only be farther ſaid, that Wheat is always as liable to blaſt and mildew upon an open Field, as in an Incloſure, provided the Land be as rich. This is a certain Truth, confirm'd by abundant Experience; and as there are Methods of Prevention in each Caſe, there is not the leaſt Juſtice in uſing this Accident as an Argument againſt Incloſure.

It is ſaid alſo, That the Number of labour-

ing People is not ſufficient for the dreſſing of all the Lands in the Kingdom, ſuppoſing they were all incloſed. Let this be fairly conſider'd, for it has ſome Weight. 'Tis certain that the ſame Quantity of well-incloſed Land demands a great many more Workmen than when open. The Cauſe of this is ſeen in the Account given already of the Culture of incloſed and open Fields, the fallowing of one, the conſtant working often of the other; and the ſeveral other Differences that will be ſhewn in their proper Place. But this Article of incloſed Lands employing a greater Number of People, is one of the greateſt Arguments in its Favour. As to there not being enough of them at preſent; all the Land of the Kingdom could not be incloſed at once; ſo they would not be all wanted at once. They would riſe as the Occaſion roſe for them. At preſent all other Employments are over-burthen'd with Numbers. The Tradeſmen ſtarve from the Multitude in every Buſineſs: a better Application to Huſbandry would take off theſe redundant Tradeſmen, and would employ thoſe Multitudes, who, becauſe they cannot get Bread at their ſeveral Profeſſions, rob and ſteal.

Here then are all the material Objections that have been made to the Incloſure of Lands, ſtated in their utmoſt Force; and every impartial Perſon will be able to judge, whether the Anſwers propoſed againſt them be or be not ſatisfactory in the Eye of Reaſon.

The Farmer, or Land Owner, who is about to incloſe, muſt know, that general Rules cannot ſuit all particular Caſes; therefore he is not to go to work raſhly, on ſeeing the Utility of the Plan, but to follow us, ſtep by ſtep, through this important Part of our Work; in which we ſhall ſhew him, that though all Incloſure is profitable in all Places, yet Incloſure of Meadow Land is one thing, and of Corn Land another; and impart to him the Reaſons of this Difference; and the Conduct he is to follow.

With reſpect to the ſtale Objection, that there are Lands which cannot be incloſed, becauſe Trees or Shrubs will not grow upon them, we ſhall ſhew him who makes it, in the Courſe of this Book, that Ignorance is oftener the Parent of this Excuſe than Knowledge. That all Trees, or Shrubs, are not ſuited to all Soils, every Child knows: but there are ſome ſuited to almoſt every Kind, and theſe ſuch as an ingenious Contrivance may work into Hedges. Where Trees will not thrive at all, there are other Kind of Fences to be made; and, in general, Nature, in thoſe very Places where ſhe denies Growth to the one, has made Proviſion of Materials for the other.

This is certain, Incloſure is always profitable; and there is no Kind of Land whatſoever, that may not be incloſed by ſome Fence or other, with Profit to the Undertaker. The beſt Methods of doing this will come next into Conſideration: the ſuiting the Fence to the Land, and the making and preſerving the ſeveral Kinds, will be treated at large in the following Chapters.

CHAP. III.

Of the ſeveral Kinds of Fences.

WHoſoever has a Piece of Land which he intends to incloſe, muſt remember what has been ſaid already, that every Kind of Ground will not admit of every Kind of Incloſure: but that there is no Land whatſoever that will not admit of ſome one or other, of the ſeveral Sorts of Fences needful to that Purpoſe.

When the Soil is too barren for the Growth of an Hedge, there is often Stone ready for the building of a Wall: and when it is too damp for the thriving of thoſe Shrubs, which uſually are planted for that Purpoſe, the very Water that denies Recourſe to this common Method will fill Ditches, which will anſwer the Purpoſe.

The firſt Thing therefore is to examine the Nature, Soil, and Situation of the Ground that is to be incloſed. Here is choice enough of Ways to do it; but a prudent Election muſt be made among them: for a Miſtake in the ſetting out will overthrow all the Expectation.

He who ſhould plant Hawthorn in a Fenn, or dig Ditches on a ſandy Hill, muſt be at once diſappointed and laugh'd at. One will rot, and the other be fill'd up. Neither can at all anſwer the Purpoſe. But that is no Proof that Incloſure, properly conducted, would not have ſucceeded.

Not only Corn Lands, but Meadow and Paſture Ground of all Kinds and Denominations, fall within the Reach of this great Benefit of Incloſure. Theſe laſt are principally diſtinguiſhed by their Degree of Moiſture. Thoſe which lie low, and within the Reach of natural or artificial Overflowings, are called wet Meadows or Paſtures; and thoſe which have a lighter Situation are called dry Meadows, or, more commonly, dry Paſtures. Some confine the Term Meadows to the wet, and Paſtures to the dry; but this is not the uſual Senſe of the Words. Beſide theſe there is another Kind of Meadow, or Paſture Ground, which is damp or wet from its own Nature, not from the Accident of being overflowed, at Times, by Rivers, naturally or artificially. This, when it is the wetteſt of all, is what is commonly called Bog; but it is not all of that Kind.

Theſe are the three great Differences of Meadow or Paſture Ground: and according to theſe thoſe Lands are to be encloſed in ſeveral Manners: all will have great Benefit by Incloſures, but there will be vaſt Advantage in ſelecting the proper Kinds.

In the dry Paſtures on an hilly Situation, Hedges are the proper Fences. They are of vaſt Service, beſide their ſheltering the Cattle, in that they defend the Graſs from the Summer Heats, and ſhelter it in the Spring from the drying Winds, that, in open Places, nip it while it is young and tender. For this Reaſon, the ſmaller the Incloſures are in dry Soils, and on hilly Situations, the better the Paſture thrives. This may be ſeen abundantly in all the hilly Paſtures of our improved Counties. All is freſh in theſe ſmall Cloſes, while the Graſs is poor, ſpare-

ing, and burnt up in the opener Paſtures. The Hedges alſo, when well form'd, are of Value for their Produce in needful Wood: and Timber or Fruit Trees grow well in them in moſt Places.

The wet Meadow requires Choice in the Shrubs that form the Hedge, and ſuch as are proper thrive ſo faſt, that the Profit ariſing from them is very conſiderable: in theſe the Incloſures need not be ſo ſmall; for lying low, and being well water'd, they are better defended in their own Nature both againſt the Winds and Sun.

For the laſt or wetteſt Kind of Paſture Land, Ditches ſtand in the Place of Hedges. They eaſily fill with Water, and are a very ſafe Fence. Beſide that, if well contrived, they at the ſame Time that they incloſe, aſſiſt greatly in draining the Land. Of this we ſhall treat particularly in its Place.

Thus we ſee that a proper Regard being had to the Nature and Situation of the Ground, Fences may always be had beſt of one Kind or other. The Quickſet Hedge will thrive in many Places, where few imagine, but this requires a Degree of Knowledge with which the Generality of Huſbandmen are not acquainted, but which we ſhall endeavour to convey to them in the plaineſt and moſt familiar Manner. In Places where the Hawthorn will not thrive, or indeed live, there are other Shrubs that will ſucceed very well, and make a good Fence. Where nothing of this Kind can be uſed, the Earth will yield Stone for Walls, which may be built at a ſmall Expence; or it abounds with Water for Ditches: and where none of all theſe can be had, Banks of Earth may ſupply the Place, and anſwer the full Purpoſe. The Perſon who is inclined to incloſe, can never therefore be at a Loſs for a Fence, provided he ſets out with a competent Knowledge in the Nature of the Undertaking. We ſhall endeavour in the ſucceeding Chapters, to give him the Rudiments of this Knowledge; and to inform him ſeverally of the proper Fences for all Kinds of Ground; and of the beſt Methods of making and preſerving each.

CHAP. IV.

Of Ditches, and their Uſe in fencing.

HAVING enumerated the ſeveral Sorts of Fences, and the Lands to which they are moſt naturally ſuited in their different Kinds, we come to the more particular Conſideration of each; and to their Uſe; and the Manner of making and preſerving them. In this Deſign we naturally begin with Ditches, as they are the moſt cheap and eaſy: and as they lead not only in ſome Reſpect to the making the others; but alſo to that very conſiderable Article, the draining of Land, which falls as naturally as it does properly, under Conſideration afterwards. From theſe we ſhall advance to the more complex and difficult Kinds made of Quickſets: this naturally leading us to the Plantation of Trees in thoſe Hedges, and their Plantation to that of Coppice and Foreſt Trees, in the regular Courſe of our Work.

Fencing by Ditches is the leaſt expenſive of all the Kinds, the ſooneſt made, and the eaſieſt to keep in Repair: but then it is only to be done in marſh or wet Land, or in the wetteſt Kind of Meadow or Paſture Land before mention'd. The Incloſer, who has Ground where there is Plenty of Water, cannot ſo well uſe any other Kind: but let him be ſure that this is the Condition of the Land; for he who ſhould dig his Ditches, and not have Water for them, would throw away a great deal of Expence, and make a very fooliſh Figure in the Eye of his Neighbours.

To know whether a Piece of Ground is fit for this Kind of Fence, the Owner muſt examine not only whether it be wet and damp, for that many Lands are at certain Seaſons of the Year, or occaſionally by Accident; but whether it be naturally and conſtantly ſo at a due Depth. Let him examine from what Source its Wetneſs ariſes, and whether this be continual; or be of ſuch a Kind as will afford a ſufficient Supply of Water for the filling his Ditches.

If his Neighbours have Ditches by way of Fence, let him examine into their State and Condition. Firſt let him ſee whether they anſwer their Purpoſes. If he finds they do not, let him conſider why: if they do, let him ſee whether they are likely upon an impartial Survey of the whole, to anſwer his Purpoſe in the ſame Manner.

If Ditches have been uſed Time immemorial in the Neighbourhood, and yet do not ſucceed ſo well as might be wiſh'd: let him enquire whether the Failure be owing to Nature or Neglect. Whether they have not been dug too ſhallow; and whether they do not fill up by Weeds, or by the Swelling of the Soil; which in very boggy Ground is frequently the Caſe.

If it appear upon the whole, that their imperfect Succeſs is owing to any natural Cauſe, let him not attempt the ſame Kind of Fence upon his own Ground, for this is a Point in which Nature will not be conquer'd. If there be not a Supply of Water, all his Art cannot in theſe Caſes bring it.

On the other hand, if he find their bad Succeſs is owing to ill Management, let him learn even from their Errors, and by avoiding them in his own Work, aſſure himſelf of that Succeſs which Nature allows. If the Fault be in the digging them too narrow, or too ſhallow, let him make his broader and deeper; if in the preſerving them, let his Care be doubled. Did theirs ſucceed at firſt, but afterwards fail when choaked up with Weeds? let his be kept as clean always as at firſt: and in the ſame Manner let him avoid the other Errors.

If he find the Ditches ſucceed well on his Neighbours Land, let him, before he ſets to work, examine ſtrictly whether his own Ground be of the ſame Kind: for often Fields that lie very near, differ very greatly. The Fen Lands in LINCOLNSHIRE, NORTHAMPTONSHIRE, and the Iſle of ELY, terminate abruptly. Ditches are the only Fence they have in many Places on theſe Lands, but he would be ſtrangely fooliſh who ſhould attempt the ſame Fence when out of their Diſtrict, though ever ſo cloſe upon the

Edge of it. No more than a careful Obſervation is neceſſary, however, to determine this; for, though the two Lands lie ever ſo cloſe, the Difference between them is palpable.

If there be no Ditches made by way of Fence in the Neighbourhood, and yet the Land ſeems by its Likeneſs in Soil and Situation, to thoſe where they are uſed, to be fit for them, let him examine carefully where Holes have been dug by Accident, or with other Deſign, whether Water comes into them, and remains in them. If he find it comes in naturally and freely, and remains there tolerably well, let him ſet the Example by a fair, though not large Trial; and if it ſucceeds, he will both continue it himſelf, and lead others to imitate it in larger Works.

When the Land lies flat, when it is wet below, and the Water that ſtands any where upon it, becomes foul and reddiſh; when the Soil is black and mellow, and in many Places ſhakes or moves under the Feet in walking, there is generally Water for Ditches, and theſe are the Fence Nature points out; for there is neither Stone in the Ground for Walls, neither has the Earth a Firmneſs for Banks, neither will a Quickſet grow there. Nature in theſe Caſes points out to the Incloſer what he is to do, for ſhe leaves only one Thing that he can do. He is to dig thoſe Fences which he can neither raiſe nor build; and there are ſufficient Advantages in this Practice: For beſide the Cheapneſs of the Work, the Soil cutting very eaſy, what is thrown up is of Uſe; ſometimes more, ſometimes leſs, according to its Nature.

In large Commons theſe Ditches run into one another; or all the leſſer into one larger, which at length communicates with ſome other Water; but in this Caſe the Water is apt to grow very foul, in the leſſer Ditches eſpecially. The happieſt Situation is where every Ditch can be carried ſtrait down to ſome River. There the Water is more conſtant, and is always ſweet. Theſe may be bank'd upon Occaſion with their own Earth; and if there be any Danger of the Cattle from one Paſture, gettting into another by wading over the Mouth of the Ditch, no more is neceſſary than the running a Rail along on each Side into the River, to a certain Depth, and they will never attempt to ſwim round it. This is the Practice all along the River Nen in Northamptonshire, and ſucceeds perfectly.

In Marſh Land in general this Sort of Fence does as well as any; and in many Caſes it is greatly preferable to any other. About ſix Foot is a proper Width for theſe Ditches, and they ſhould be about ſeven in depth, that there may ſtand four or five Foot Water in them uſually; that in Droughts there may always remain ſome, and that they may hold two or three Foot perpendicular more in Overflowings, without running over upon the Land. By this Means they will ſerve as a good Fence at all Times, and not be liable to Accidents from ſmall Occaſions.

When a Fence of this Kind is made, a little Care will preſerve it, but that Care muſt be uſed, otherwiſe it becomes preſently over-grown and uſeleſs; or what is as bad, the Weeds cover it ſo thick, that Cattle attempting to walk over fall in, and are not able of themſelves to get out again. This is a common Accident on the careleſs Peoples Grounds in the Iſle of Ely, but it very ſeldom happens where Things are better regulated. Weeds are very apt to grow in theſe ſtill Waters; and the Soil is ſo ſoft, that the Banks and Edges of the Ditch are eaſily broke, and ſpoil'd: but in the very worſt of theſe Places, when the Ditches are properly clean'd, this Accident ſcarce ever happens. When the Water is tolerably clean, and the Bank ſtrait and ſteep, there is hardly any ſuch Thing to be heard of as Cattle falling in.

Theſe Fences do not anſwer the Purpoſe of a Hedge in defending the Graſs from the ſcorching Sun, or parching Winds; but then the Moiſture of the Earth in all theſe Places where ſuch Fences are proper, or but practicable, anſwers the ſame Purpoſe, and renders ſuch Defence unneceſſary. And at the Time as this Moiſture is naturally too abundant in ſuch Grounds, the ſame Ditch which ſerves for a Fence, anſwers in ſome Degree the Purpoſe of a Drain. I have obſerv'd, that the Water is to ſtand in the Ditch two or three Foot below the Surface, and in this Caſe, which is commonly about the Mark, the uppermoſt two Foot of the Earth is drain'd in a great Meaſure by it, and this Depth takes in all the Soil; all that has any Thing to do with the Growth.

This is a very important Circumſtance, and Experience confirms it. It will be explain'd more at large in the next Chapter, which treats of Draining; but 'tis certain thus far, that ſo much Good is to be done in many Situations by the Ditch fencing alone, that the ſame Ground which lying open is wet and ſhakes under the Feet, and receives their Impreſſion when one treads upon it, will upon the dividing it by a good Number of Ditches, be render'd firm and ſound; and its Product in all Reſpects better. This ſhews that in dividing and incloſing Land by Ditches as well as Hedges, the ſmaller the Incloſures are generally made, the better.

The Earth that is thrown up in digging of theſe Ditches, is a very conſiderable Quantity, and according to its Nature, or the Circumſtance of the Place ſerves different Purpoſes. Sometimes the whole, and ſometimes a part is requir'd for banking at the Edge of the Ditch itſelf. The Earth itſelf is ſometimes entire fine Mould, and not unfrequently in theſe wet Lands, it is either a true Peat, at ſome little Depth, or is ſo intermixed with Roots, that it will make a Kind of Peat at the Surface. In Lincolnshire they cut it for this Purpoſe into proper Pieces, whether it be of the better or worſer Kind; and burn it either alone or with dry'd Cow Dung: and the fine black Mould that is dug up is excellent to mix with Dung for the manuring of the dry Corn Lands.

CHAP.

CHAP. V.

Of Draining in general.

FROM the Conſideration of fencing by Ditches, we are naturally led to that of draining, as it is a Practice uſed on the ſame Kind of Lands, and has its Foundation in the ſame Courſe.

The Lands which have Occaſion for draining, are always ſuch as admit no other Fence but that by Ditching, for they are too wet for Quickſet Hedges, and too ſoft to bear the Weight of Walls; ſo that nothing rais'd upon the Surface can anſwer the Purpoſe.

Theſe Lands are of two Kinds, their Difference ariſing principally from their Situation: the one Sort lie between Hills, or upon ſome Level on their Sides, or even on their Tops in ſome Places. Theſe are called by way of Diſtinction, Bogs, or boggy Lands: the others lie in a Flat, and often extend upon an exact Level for a vaſt many Miles. Theſe are called Fens and fenny Lands. Such as thoſe in the Iſle of ELY, LINCOLNSHIRE, and elſewhere.

This is the general Diſtinction eſtabliſh'd by Cuſtom; and thus we are uſed to call them, though if the Word Bogs and boggy mean only wet and ſoft, as many uſe them, they are as applicable to many Parts of the Fens, as to the hilly Quagmires, many of theſe Fens being as tender and ſoft, and ſhaking under the Foot as much to the full as what are more particularly called Bogs upon the Hills, or between them.

There is ſome Difference in the Ways of draining theſe variouſly ſituated wet Lands, and to this is owing the Difference of their Denomination. In this Diſtinction the boggy Lands have an Advantage over the fenny, in that they have a greater Deſcent to drain them; and thence principally ariſes the Difference in the Methods of proceeding: on the contrary, the fenny Lands have this other Advantage, that in general they are leſs wet, and leſs rotten, than thoſe Bogs eſpecially which lie between Hills.

To underſtand upon what Foundation the Draining of theſe Lands is eſtabliſh'd, it will be neceſſary to know from what the Miſchief ariſes: or how they become ſo wet and ſoft within, that they are render'd unfit for all the Uſes of Agriculture.

Bogs are made by Springs, which riſe at ſome Depth under the Surface in thoſe Places. Hills naturally give riſe to Springs, and when theſe iſſuing from ſome Depth, meet with a Weight of Earth that pens them in, they ſpread under the Surface where the Soil is ſoft, and they moiſten and rot it, till it becomes a Quagmire underneath, cover'd only by a Turf at the Top, which ſinks as it is trod upon, riſing in ſome other Place, and is continually in a trembling Motion.

Fen Lands on the contrary, lie on Flats, are nearly upon the Level with the Water of Rivers that run near them, and are ſubject to be overflowed by the Swelling of thoſe Rivers. When this happens, they lie ſo flat that the Water cannot get off; and hence ariſes the Neceſſity of draining them. There are ſome Fen Lands that are conſtantly and continually wet, not accidentally from thoſe Overflowings. Theſe approach more to the Nature of the Bogs; and the Method of draining them is to be accordingly contrived, partly from that for Bogs, and partly from the other.

CHAP. VI.

Of draining boggy Lands.

THE firſt Thing to be done where a Piece of boggy Ground is to be drain'd, is to examine it well in order to find the loweſt Part; and to obſerve what Deſcent there is. When this is found, a Drain is to be open'd, and it muſt be cut through the Ground to ſuch a Depth, that its Bottom be at leaſt a Foot below the Level of the Springs. When this is done, the Water from the whole adjacent Ground naturally drains into the Cut; and there, provided a free Paſſage be kept open, it runs off.

From what has been ſaid before of the Nature of the boggy Land, it is plain that this ſingle Operation, provided it be judiciouſly deſign'd, and properly perform'd, muſt effect a Cure. We have ſeen the Cauſe of this Boggyneſs is, that the Water of certain Springs is damm'd up, or pent in by Earth; a Paſſage is here given, and conſequently the very Cauſe of the Evil is removed. The Water that ſwelled and ſoaked the Ground, becauſe it could not get off, has now a Paſſage by which it runs away freely and continually; and the Ground which was made a Quagmire by its being before pent in, becomes dry enough to be uſeful.

The great Caution to be obſerv'd in this Particular is, that the Drain be cut deep enough: for if it be not deeper than the Bottom of the Springs, the Remedy will be imperfect. There will ſtill be a Lodgment of Water at the Bottom of the Bog, the Drain carrying off only what is above the Level of its Bottom; and it is ſurprizing to ſee how much Miſchief a little Wet at the Bottom of a Land, that has been us'd to be boggy, will do.

The Depth is ſo uncertain, there is no giving any general Rule for it: but ſome gueſs may be made from the Nature of the Ground, and its Situation. The Way appears greater to the Spring than it naturally is, becauſe the boggy Land is raiſed and ſwelled up beyond its proper Surface, by the Force of the Water that is confin'd in it; inſomuch that in a Bog well drain'd, it will often ſink two, three, or four Foot from what was the Height while wet.

The Depth at which the Springs lie, is always greater according to the Weight of Earth that pens them in: but he who ſets about this with Diſcretion and Judgment, will know whereabouts it will fall, from his Obſervations; and he muſt have Reſolution to go through what he has undertaken, for all will be ſure Profit in the End.

The Drain muſt be begun in the loweſt Place, and carried into the Bog towards the Spring Head; and Trenches are then to be cut acroſs, at proper Diſtances; by Means of which every Part of it will be drain'd thoroughly, and perfectly.

The Breadth of the Drain muſt be proportioned to the Depth; and this the judicious Undertaker will eaſily contrive, for, by the beforenamed Obſervations, he will be able to gueſs very nearly at the neceſſary Depth of the Drain, before he begins the Work.

Some farther Cautions are neceſſary to be given in this general Account of draining Bogs, for the ſecuring and keeping the Advantage perpetual, and avoiding Inconveniences.

When ſmall and ſhallow Drains are ſufficient, as is often the Caſe, particularly in ſome of the ruſhy Bogs, they may be left open; and no farther Care is neceſſary than to look at them now and then, to ſee they are kept from filling up. But when they are broader and deeper, ſome Precaution is neceſſary to prevent Accidents.

As has been directed in the cutting of Ditches, by Way of Fence, the Earth that is thrown out muſt never be left upon the Edges of theſe ſmall and ſhallow Drains, as is too frequent a Practice. If it will ſerve to neither of the Purpoſes there mentioned, of Firing or Manure, it muſt be carried off, to be thrown away; but generally it is a Kind of turfy Matter, and will make a coarſe Sort of Fuel.

When the Drain is wide and deep, as there is no Neceſſity for keeping it open at Top, 'tis beſt to cover it up to prevent Cattle tumbling in. In this Caſe a good Quantity of rough Stones muſt be thrown in: they ſhould be ſuch as are hard, and will not ſettle too cloſe, but leave a free Paſſage for the Water among them. Upon theſe is to be laid refuſe Wood, and over that ſome of the Earth that was thrown out in digging. By this Means a thorough Paſſage will be left free for all the Water the Springs yield, and there will be none of theſe frightful Openings upon the Surface. Care muſt be taken to keep the Trenches clean; and then this main Drain will keep in order for Ages, and preſerve the recovered Land from growing wet again.

This is the common Practice in the draining of boggy Lands, explained in all its Branches, and ſhewn to be founded upon a real Knowledge in the Cauſe of the Dampneſs of ſuch Lands; but it is not our Intention to leave the practical Huſbandman, with only the common and general Rules to guide him. Experience has ſhewn, that the beſt general Methods admit of Improvement in particular Inſtances; and we ſhall ſhew him how he may take a different Courſe from the common, in ſome Caſes to a greater Advantage.

Though in many Places the Trenches running to the main Drain, will keep clean and open of themſelves, if the Earth thrown up out of them be removed; yet in ſome Bogs the Earth naturally ſwells in ſuch a Manner, that they will fill up of themſelves, though cut to a conſiderable Depth, from their Bottoms riſing, and their Sides puſhing towards one another.

I have ſeen in Lancashire ſuch ſtrong Inſtances of this, that one might trace the old Trenches over the Surface of the Bog, not in Hollows, but in a Kind of rough Seams, as it were, rais'd up above the Reſt of the Surface; as the Letters and Figures carv'd in the famous Grotto of Antiparos, not only fill up in Time, by the ſwelling of the Stone, but project beyond the Level.

In theſe Caſes the Bog always remains a Bog ſtill. The Expence has been thrown away, and the Attempt of draining given over: if ſuch diſcouraging Circumſtances ſhould croſs our Undertaker, 'tis fit he ſhould know how to guard againſt them: for that is to be done, and there is no Need of giving up the Deſign.

In this Caſe he is to treat his Trenches in ſome Degree as he does his wide and deep Drain, keeping them from filling up of themſelves, by throwing in ſomething between that will preſerve an Opening for the Water, and yet keep the Sides aſunder.

The beſt Method of doing this is as follows. In the firſt Place, let the Trenches be cut ſomewhat deeper than otherwiſe they would need to be, ſuppoſe, for Inſtance, three Foot deep, and two Foot over. Then, as ſoon as they are made, let the Bottoms of them be cover'd with freſh cut black Thorn Buſhes: upon theſe let him throw in a Quantity of large refuſe Stones: over theſe let there be another Covering of black Thorn Buſhes, then a Covering of Straw; and upon this ſome of the Earth, ſo as to make the Surface level with the reſt. Theſe Trenches will always keep open, and their Advantages will be found in every Inch of the Land.

In this we are only bringing the Experience of one Part of the Kingdom to the Aſſiſtance of the others: we are only laying before the Huſbandman of Lancashire, the Practice of the Drainer in Oxfordshire, for this is a well known thing there, and has been continued from Father to Son theſe many Generations.

Nothing is more eaſy nor more familiar to Reaſon; nor is there any boggy Piece of Land where the large Drain can be made effectually, that will not be perfectly cur'd by this Practice. Yet ſo little ready are the Huſbandmen, in general, to make uſe of their Reaſon againſt croſs Accidents, or to enquire into the Practice of others, that, at this Hour, many Pieces of boggy Ground may be ſeen in the County before-cited, with the Trenches all grown up, as juſt mentioned, and with a deep dirty Drain half full of Rubbiſh, which might every one have been thoroughly and perfectly cur'd, by this ſingle and ſlight Expedient. So eaſy is it to throw away Money to no Purpoſe upon the moſt rational Deſign; and to give up what is practicable.

In Staffordshire, inſtead of black Thorn Buſhes, they make the firſt Lay of a Quantity of freſh Heath, and then put the Stones, covering them with a good Coat of more Heath, and then with Earth. This is a better Method where Heath is to be had; and that it commonly is in the Neighbourhood of Bogs, for it is tougher and more durable in the Wet than the other; and at the ſame Time, though it lies cloſer a great deal, yet there is ſomething ſo ſtubbed in the large Shoots, that they will not be preſs'd entirely flat.

It

It is certain, that the worſt boggy Lands that lie upon or between Hills, may be drain'd by this ſingle Method: which is eaſy, cheap, and not liable to failure by Accidents, if properly conducted: and it is equally certain, that the Value of the recover'd Lands is very great, for they become fit for a Variety of Purpoſes, as ſhall be ſhewn hereafter.

Let not their Appearance, while in a Bog, diſhearten the Undertaker; for their Produce, when reduced by draining, to firm Land, will be altogether different from that which naturally grows upon them while wet; and this Improvement may alſo be promoted by Art: but before we ſpeak of that, it may not be improper to give one farther Method of making the neceſſary Drains, in ſuch boggy Ground as is ſoft and mellow, and but moderately wet.

For this Purpoſe ſeveral Holes are to be dug in a ſtrait Line along the Bog, at about eight Foot Diſtance; theſe are to be about ſeven Foot deep, and four Foot wide. A Man is to get into one of theſe as ſoon as it is dug, and to work away toward the next, each Way, leaving a Coat of Earth of about three Foot thick at the Top. Thus he is to proceed in each Hole, till, by this Means, the ſeveral Burrows meet, and there is a ſubterranean Drain made through the whole Bog.

Bruſh-wood, or any uſeleſs Materials of a like Kind, are to be thruſt into the Drain everywhere, to keep it open, and thus the Water will be carry'd off with great Certainty, and the Bog will be left dry and firm Land. This Method was firſt invented near Weeford in Staffordshire, and is at this Time practiſed in many of the neighbouring Places with a laſting Succeſs.

When a Piece of Ground is thus recover'd from its boggy State, it will ſtill be found unfruitful. Its natural Product in this wet Condition was Moſs, and it will continue to yield Nouriſhment to that, and, till aſſiſted by Art, to little elſe, becauſe all its Juices will be exhauſted by that uſeleſs Production. To cure this Fault, it is to be dreſs'd with Aſhes, kept dry, as before directed, in the Chapter on that Subject, in our Second Book. Theſe are to be ſpread over it, at the Rate of thirty Buſhels to an Acre; and they will act very effectually, in deſtroying the Moſs, and in enriching the Soil for better Products.

CHAP. VII.

Of the Draining of Fenny Lands.

IN treating of Fen Lands we are to diſtinguiſh, as before hinted, ſuch as are naturally wet at the Bottom; and ſuch as become wet by the Overflowings of Rivers, from Land Floods, or other Accidents; for a different Method is to be taken in theſe diſtinct Caſes. In one, nothing is to be done but the carrying off a Quantity of Water that has fallen upon them by Chance, and ſtagnates there, becauſe of this flat and level Situation: in the other, or thoſe naturally and continually wet, all is to be done that is requiſite in the draining of Bogs, of which they are a Kind; and often the moſt difficult of all to drain, becauſe of their flat Situation.

As to thoſe Fen Lands which are only overflowed at Times, and have a good Soil, if the Water could be carried off at Pleaſure it would be an Advantage, and not a Detriment, provided it fell on at proper Times; for it would only anſwer that uſeful Practice, the drowning of Meadows. The Soil of theſe Fens is, indeed, generally good: but the Water does not always come on ſo regularly as it might be wiſh'd, nor is it to be got away without Labour and Expence: a great Part of it uſually remaining till the Sun and Wind carry it off. This is much too long for it to lie profitably on the Land, and hence ariſes that Injury which ſuch Fen Lands ſuffer, and the Advantage of draining them.

If the Water can be compleatly carry'd off from the Surface of theſe, 'tis all that is requir'd; but in the other Caſe, were the upper Part of the Soil ever ſo well drain'd, the Source of the Wet being within its own Bowels, the Miſchief would return, unleſs that had a Way made for it; which can only be done upon the true Principles of draining, as laid down in the former Chapter: the finding the Deſcent, and cutting Trenches to a proper Depth. In general alſo this is the beſt Way with thoſe which are only ſubject to occaſional Overflowings; for when theſe have happened often, and the Water has been uſed to lie a great while upon them, they are ſoak'd down to a great Depth, and have acquired, by Habit of Wetneſs, much the ſame Qualities with the naturally boggy Grounds. Indeed, the carrying off the Water lodg'd on them, by Land Floods or heavy Rains, is only a ſuperficial and partial Cure: the draining them to the Depth, though it may be a more expenſive, is a much more perfect Remedy: nor is the other ever to be done perfectly, by all the Contrivances that have been made. The beſt they do is to get off a great deal of the Water, and leave the leſs for the Sun to dry up; for they never drain them entirely.

The judicious Undertaker will, to each Kind of Land, if it be of any Extent, uſe both theſe Methods; for by firſt throwing off the ſuperficial Water, he will be able to carry on his Works for a deep and thorough Draining, with much greater Eaſe and Succeſs.

This ſuperficial Water may be carry'd off by Engines, when in very great Quantities, with little Expence: the Sight therefore of a Sea upon the Fen, at certain Seaſons, need not diſcourage the Undertaker from his Attempt. I have ſeen many Fen Lands of great Extent, that have been a perfect Lake to Appearance for ſome Time while overflowed; but, by Degrees, a good Part of this has run off, and the Remainder, which has lain and render'd the Ground uſeleſs, might have been carry'd away by the moſt common Engines. But the Negligence in this Caſe is ſurprizing. We propoſe here to inform the Farmer how he may make an effectual Cure; not only preventing the Effects of his Neighbour's Neglect, but rendering the Land ſafe for ever, from either its own Wetneſs, or ſuch Accidents.

This compleat Remedy and Preſervation is to be effected by three Things, ſuppoſing the Land both wet in itſelf, and liable to Overflowings.

Theſe are, firſt, the taking off the Water lodg'd on the Land, at preſent, by Floods; ſecondly, the draining it of what riſes from its own Bottom; and, thirdly, the preventing its being overflowed from the Land Floods and Rains for the future.

For the firſt Purpoſe, or carrying off the Water that has been brought on and left there, by Land Floods, many Engines have been contrived, and are, at this Time, uſed in different Places; but none anſwers better than the Sail Wheel, which they call, by way of Eminence, in the Iſle of Ely, the Engine. This is compoſed of about a dozen Spokes, faſhion'd according to the particular Purpoſe, and is turn'd by Sails like thoſe of a common Windmill.

This Engine will carry Water excellently either off a Flat or where there is ſome Riſe; but for this different Uſe there is to be ſome Variation in the Make of it. When 'tis only to puſh the Wet along a Flat, for the getting it off, the Spokes are made broad, and ſet a little ſloping. And 'tis amazing how vaſt a Quantity of Water it will thus throw off in a Day's Time, the Spokes all moving between a couple of upright Boards, which make a kind of Trench for them to play through.

When the Water is to be rais'd to any little Height, in order to be carried off, the Spokes are made hollow like ſo many Scoops; and they are ſet ſo as to deliver the Water juſt at that Pitch, which they do inceſſantly, and with great Regularity.

Laſtly, if the Water be to be thrown out at a larger Height, as over a Bank, or an Eminence of the Ground; the Spokes are for this Purpoſe, made in the Faſhion of ſo many Boxes, which do not throw the Water out before them, but take it up, and retain it; letting it, as they riſe, run into an hollow Circle that goes round the Spokes, at about half their Length, whence it is diſcharg'd again from the Back of the Spokes as the Wheel deſcends.

Thus is this Engine ſuited to all the common Purpoſes of Draining: and kept up in Repair at a ſmall Expence: ſo that the Farmer is right to prefer it to many of the more complicated Machines that have been propos'd, with Promiſe of Miracles from their Inventor, but with much leſs real Advantage than is every Day found from this plain and common Wheel.

When the Water of the Land Floods is thus carry'd off, the Undertaker is to ſet about to remove that which riſes in the Land from its own Bottom. This he will do with Eaſe enough, now that the accidental Load is taken away; whereas, otherwiſe, there would have been endleſs Interruption of his Works, and Miſtakes about the Springs.

He is now to act exactly upon the ſame Principle as in draining of the Bog, only as the Compaſs of Ground in the fenny Lands is often greater, the Works of every Kind muſt generally be larger.

A main Drain is firſt to be cut; and this muſt be done with the utmoſt Care and Contrivance, for upon this the Succeſs of the Undertaking depends. The Situation of the whole Land to be drained, muſt be conſider'd for this Purpoſe. And this main Drain muſt then be cut deep enough to carry off the Water from the whole Level, at the Depth from whence it is found to ariſe: This is often not more than a Foot or two below the Surface in the loweſt Places.

The Breadth of this Drain muſt be proportion'd to its Width; nor need the Undertaker be under any Concern on this Head: for ſuppoſing all to be abſolute Refuſe that is thrown out, the Benefit ariſing to the Land will very well pay the Expence: but often it is of Uſe, as has been obſerved already.

The Depth and With of this main Drain being determin'd, its Courſe is the next Thing to be conſider'd. And for this little Advice will be ſufficient, for it is to be carried from the loweſt Part, as its Bottom, to the neceſſary Part of the Ground.

As to its Form, it muſt be wideſt at the Mouth, or Opening, and muſt grow narrower all the Way to its Head.

If the Compaſs, or the Situation, or other Circumſtances of the Ground require it, there may be more of theſe main Drains: and there muſt be ſo, where it is plain, as often appears at Sight, that one cannot anſwer the Purpoſe. In this Caſe they are all to be made exactly as the ſingle one already deſcribed; to be carried in a ſtrait Courſe; to be of a ſufficient Depth; and to be wideſt at their Mouths, and narroweſt at the Head.

When the main or middle Drain is finiſh'd, it will be needful to open a great Number of other leſſer Drains; though, in theſe large Works, they are generally too big to be called by the Name of Trenches. Theſe muſt be cut upon the ſame Principle with the great one, narroweſt at the Head, and wideſt at the Mouth; and of a proportioned Depth.

Theſe ſmaller Drains are to be brought from every Part of the Work; and to be carried ſtrait into the great Drain, at the neareſt Parts.

All being thus prepared, the Effect will immediately follow, and will be ſuch as is not to be conceived by thoſe who have not been accuſtomed to theſe Undertakings. The Ground which has been left ſoft and pappy, from the Water juſt carry'd off; and which is ſhaking at every Step in the lower Places, from its own natural Wetneſs, will, by the continual running off of the Water, become dry and ſolid. It will ſink a Foot or more throughout, if it have been naturally very boggy; and it will remain faſt under the Feet without ſhaking, and bear Carriages. I have ſeen Lands, on which a Horſe's Foot would break through the Turf, and he would be let in up to the Belly, become hard enough for a Waggon in a little Time by this Method: and ſuch as would ſwell and riſe, and dance under a Man's Foot like weak Ice, bear a Coach over them without Motion; in ſhort, by Degrees, the wetteſt and boggieſt fen Land will thus be brought to a Conſiſtence for every Sort of Culture.

When this good Effect has been obtained from the Drains, the Undertaker's Care is not to ſtop: for though, with proper Caution, the Ground thus recover'd will keep good for ever; yet, with Neglect, it will ſoon relapſe into exactly its old Condition.

To prevent this, in the firſt Place, Care muſt be taken to keep the Drains clear, and of their due Extent and Depth at all Times. Twice a Year, that is, in the Beginning of October, and about the End of April, they muſt be thoroughly cleanſed from Weeds, Mud, and other Foulneſſes, that gather very faſt in them, and when they are neglected, ſoon choak them up, and return all into the old Condition.

But beſide this, Care is to be taken alſo, to prevent the Miſchief of Floods, acting upon the Land as formerly. 'Tis true that the Water brought on by thoſe, could not remain upon the Ground as it uſed to do, becauſe of the Service of theſe Drains, but then it would in running off, tear and deſtroy all the Works; and beſide the immediate Miſchief it would always occaſion, would entail an endleſs Expence upon the Undertaker.

To guard againſt this, let him examine well in what Place, and from what Source theſe Waters came on. If the Inundation happen from the Overflowing of a River, the Buſineſs is to bank in that River in a proper Place, leaving it ample Scope for its Courſe, but juſt keeping it off the Ground. If it happen immediately from the high Lands, Care is to be taken to give it a Vent into the next River, to prevent its falling upon the Lands: this Work will require in ſome Places more, and in ſome leſs Expence. In ſome Situations it is impracticable, and then the Drains muſt be truſted to: but where it can be done within any moderate Price, it is always worth while; for the Recovery of ſo much Land under a Certainty of its continuing good for ever, is an Article of prodigious Importance.

Different Fen Lands lie under different Degrees of the Inconvenience of being drown'd, and in ſome the Remedy is eaſy, in others more difficult, in ſome utterly impracticable, within ſuch an Expence as the Advantage would repay. Where all the Sources of Boggyneſs and Wetneſs concur, the Methods already deſcrib'd are all to be uſed; where only a Part, there Part of the Remedies is ſufficient. We have in this Conſideration taken it at the very worſt; and the Undertaker ſees all he can have to do in order to carry off the accidental Load of Water, to drain away the in-bred Quantity, and to keep the Land dry, that he has thus recovered from its uſeleſs State: he is happier where leſs of the Sources of the Miſchief concur, that he may reap all the Advantages at leſs Expence.

CHAP. VIII.

Of draining flat Lands near great Rivers.

THE Borders of large Rivers near where they run into the Sea, afford often a peculiar Kind of Lands that require draining. Theſe lie within the Reach of Tides, which riſe high in ſuch Places, and being alſo liable to the Effects of Land Floods, no Grounds whatſoever are ſubject to receive ſo large a Quantity of Water: but then none are ſo eaſily freed from it, or at ſo ſmall Expence.

Theſe Lands lie above the low Water Mark, and below the high Water Mark; there are many of them along the Side of the Thames, where at one Time they were waſte and neglected, but at preſent are drain'd, and are very valuable. All large Rivers where the Tides run high, are border'd in many Places with ſuch Grounds: and beſide the Tide at its Times, they uſually receive Land Floods, and give them into the River by a Creek.

Theſe Lands have by ſome been confounded with Salt Marſhes (of which we ſhall ſpeak hereafter) but very improperly: they have great Advantages over them, in that they afford freſh Water which the Marſhes naturally want; and Shelter for the Cattle, in which they are uſually as deficient. They have often all the Requiſites for being excellent Land, and only ſtand in Need of being drain'd and defended from freſh Overflowings.

Whoſoever ſhall have ſuch a Piece of Land in his Hands, and has the Prudence to intend rendering it ſerviceable, is freed from the Labour and Expence of Drains, for the Creek form'd by the freſh Waters for themſelves, anſwers that Purpoſe. He is only to manage the Outlet of this rightly, and to defend it by a Bank.

The firſt Work to be undertaken is, the Bank: this is to be carried all along the Edge of the Land to the River, only leaving the Opening of the Creek for the preſent; for ſhould that be block'd up, the Land would be drown'd by the freſh Waters, which would have no Paſſage: and yet if it were left thus entirely open, the Tide forcing itſelf up at its Riſe, would overflow the Lands as uſual, and burrow its Channel deeper.

Therefore when the Bank is all made, and firm, the Creek is to be ſtop'd up at once by a Number of ſtout Workmen, with good Materials, who are to make a very thick and ſtrong Head to it, only laying in three or four long Troughs of Wood, which are to reach quite through the Head into the freſh Water of the Creek, and to open into the River. Theſe Troughs are to be made each of four rough Planks, and are to be open at the End next the Creek; but at the End that comes to the River, they are to have each a Door that flaps to, when the River Water bears upon them, but that opening out-wards gives Way freely to the Land Flood.

When theſe Troughs are laid in, the Bank is to be carried on over this Head, and all is done. The Doors, opening out-ward, give Way to the Water of the Creek, which runs out freely all the Time the Tide is down; and when that riſes, inſtead of forcing in, it only ſhuts the Doors of the Troughs. So that the whole Inconvenience is, that none of the freſh Water can run out, while the Tide is at this Height; but the Troughs being proportion'd properly, the Diſcharge during the Hours of low Water is ſufficient. As the Doors of the Troughs keep out the Water there, the Banks keep it out from the Edge of the Field; and the whole is at once ſecur'd from Inundation.

This is an Undertaking in general the more profitable, in that the Lands thus recover'd, are

for the moſt Part of the beſt Kind we know for Paſturage. There is ſome Expence in the making of the Bank, but it is eaſily kept up, and the Troughs, if made of proper and firm Stuff, will laſt a great while without Repair.

CHAP. IX.

Of the ordering of Salt Marſhes.

'TIS a great Quantity of Land in this Kingdom that comes under the Denomination of Salt Marſhes, and this is with Reaſon ſeparated from all other Land, being in its Nature, Qualities, and Products different from all beſide. The Sea Water is to be kept off from this, and that often at a conſiderable Expence; but this is not all that is required for the rendering it uſeful according to its intrinſick Worth. For this Reaſon it were idle in this Chapter to treat only of the Means of keeping it dry: the whole Method of managing or ordering it ſhall be laid down.

A great deal of the Salt Marſh Land in England, is at preſent turn'd to a very good Account. But the greater Part even of that might be made to yield a much larger Profit, and ſome that is utterly neglected, becauſe Improvements of it are ſuppoſed impracticable, might be render'd of great Value to the Owner. We ſhall therefore begin from the Source here. We ſhall enquire into the different Conditions of Sea Marſh Land, and lay down not only the common Methods which are every where practis'd with Advantage, but make publick ſuch as are peculiar to certain Places, tho' they may be uſeful in all; and finally add, what Reaſon ſhews may be done farther with Profit.

In the firſt Place, what we underſtand by Salt Marſh Land, is a Land that lies low and flat, and is within the Reach of the Sea, or Salt Water, at the Mouth of great Rivers. Hence it is liable to be overflow'd by the Salt Water, and the Ditches are full of the ſame at all Seaſons of the Year.

Now we may eaſily ſee, that though this Land be ever ſo good in itſelf, as the moſt part of it is very rich, yet from this Condition of being continually liable to Overflowings of Salt Water, it will be ſoaked too much: it will yield or keep no freſh Water for the Uſe of Cattle: no Trees or Shrubs will grow well upon it; ſo that there will want Shelter: and its Produce, whatſoever, will be liable to be cut off by the nipping Winds of the Spring, becauſe it is expos'd to them, and to the Sea Breezes which are yet more deſtructive than they.

By this Account we ſee how many Diſadvantages this Land lies under, beſides thoſe of that before mention'd: but ſtill its natural Richneſs makes it worth taking Care off. The Work muſt be more, and the Expence greater than that which is needful on the other, but then it will anſwer very well by its Fertility.

The two great Inconveniences attending Salt Marſh Land, are theſe, the Overflowings of the Salt Water, and the Want of freſh. Theſe may be provided againſt, and when this is done, if we add Shelter for the Cattle that are to be fed there, as well as the Crop they are to be fed upon; we ſhall bring them to be equal or ſuperior to any Paſture Lands whatſoever: and this is to be done with Certainty.

For the firſt Thing, let the Undertaker of theſe Lands, when he has conſider'd the Source of their Misfortune, the Abundance of Salt Water thrown on them; examine their different Condition; in what Degree they are liable to it; what Quantity of building or banking will be needful to keep it out; and in what Reſpect they are as to Shelter and Trees.

When this has been thoroughly conſider'd, let him ſet to work, remembering that he has three great Articles to accompliſh, namely, the keeping off the Salt Water, the getting a Supply of freſh; and the giving that Shelter which Nature has denied.

The Sea or River Tides are to be kept out by Banks or Walls. When 'tis only the Water of a River to which they lie expos'd, banking will do, but then it muſt be at a very great Expence: where 'tis the main Sea that beats upon them, Walls are the beſt Security, and theſe muſt be made of a vaſt Thickneſs to reſiſt the Force and Weight of the Water; and of a great Height to defend the Lands from the higheſt Tides.

When Banks are uſed, they are to be cautiouſly made in Form as well as Subſtance, and no Expence is to be ſpared in the giving them a due Body and Height; for if there be, all that is beſtow'd is often thrown away. To come to Particulars: when the main Sea is to be fenced out from a good Compaſs of flat Salt Marſh Land, let the Undertaker lay the Foundation of his Bank fifty Foot broad, and carry it ſloping and tapering all the Way to the Top. The Height muſt be ten or twelve Foot, and the Thickneſs at the Top about three Foot. It is to be raiſed of ſound Earth well laid together; and the Slope is to be principally on the Face next the Sea. This Part muſt alſo be cover'd evenly with Turf, like a Bank in a Garden; that the Waves may roll eaſily againſt it; not bearing againſt a Perpendicular with all their Weight and Force, nor meeting with any Thing to ſtop, interrupt, or ruffle them in their Courſe.

Let any one obſerve the waſhing of the Sea Water upon ſuch a Slope, and upon a common Shore, which is rough as Nature leaves it, and he will ſoon ſee the Reaſon of this Advice. The Waves have fifty Times the Force againſt the Ground where they are ſtopt, and broken, that they have when they roll up evenly and ſmoothly.

While the Face of this Slope is entire, they always run up in that Manner, and the Bank is ſecure; but whenever there is the ſlighteſt Breach in the Turf, the Waves tear and enlarge it in a ſurprizing Manner. This may inſtruct the Owner to have the Bottom of the Banks carefully look'd to from time to time, that the Turf is kept ſound. A ſmall Expence will anſwer this, for 'tis only two or three Feet at the Bottom that is liable to Miſchief, the Tides riſing but ſo high againſt a ten Foot

Bank in their common Courſe; the reſt of the Height being made for preſerving againſt thoſe extraordinary Tides, which happen once in a Year or two, or at greater Diſtances of Time.

Where Stone is to be had conveniently, Walls are an excellent Fence againſt theſe Seas. Their Proportion muſt be nearly the ſame with that of the Banks; and they anſwer to the additional Expence by being very durable.

The Name of a fifty Foot Bank may fright one who is not accuſtom'd to this Kind of Work, but it does not come to ſo much as might at firſt Sight be imagin'd. 'Tis of this Thickneſs only at the Foundation, and 'tis to be made, at the common Price of Labour, for an Expence that a few Years of the Profit by the Land repays.

'Tis here ſet at the higheſt: where the Sea has leſs Power, a ſmaller Expence will ſerve, but at the moſt that can be needful, 'tis perfectly worth the Charge.

When the Land is thus defended from the Overflowings of the Salt Water, it will be found in a Condition to bear excellent Paſturage; and the next Conſideration is to find freſh Water. For this Purpoſe let the Undertaker look out for a convenient Part of the Land, and there ſink a large Pond. Let this be well lin'd at the Bottom and Sides with a tough Clay, and left to receive the Rains. It will hold theſe, and ſupply a large Number of Cattle.

When the Recovery of this Salt Marſh Land is carried thus far, the next Deficience is to be conſider'd; that is, the Want of Fences: whether theſe are wanted in the common and literal Senſe of the Term, of ſeparating one Piece of Land from another, or not, they are ſure to be needed doubly here, to what they are on any other Lands, in the farther Occaſion of ſheltering the Cattle, and defending the Graſs from the Winds.

We have ſeen the Land from a Salt Water Marſh, reduced to be dry, and to bear good Paſturage, and we have ſupplied it with freſh Water: but we ſhall find the Cattle miſerable for want of Shelter, and the Graſs will often be ſeen cut off at the Tops in Spring by the Sea Breezes, as if it had been mow'd. To prevent this, the firſt Attempt is to be by Plantations of Trees and Hedges. Ditches alone will ſerve for Fences, and the Separation of Grounds in thoſe Places, but theſe are wanted for the other Purpoſes.

If one Kind of Tree or Shrub will not thrive upon the Ground, let the Undertaker try another, and ſo on till he has gone the Round of all that can be uſeful. It muſt be confeſs'd, there are ſome Salt Marſhes on which none of the common Trees will thrive; but even here there are uncommon ones to be called in. The late Lord Petre, of Thorndon in Eſſex, gave Slips of a particular Shrub, called the Sallow Thorn, or Sea Buckthorn, to an Owner of ſome Marſh Land, whereon no other Hedge would grow, and it ſucceeds to this Day very well. This is not the Shrub one would chuſe preferably to others for a Hedge; but where others will not thrive, 'tis valuable.

The Native Place of this Sea Buckthorn, as its Name expreſſes, is by the Sea, ſo that no Wonder it does in theſe Places. 'Tis raiſed for its Beauty in moſt of the Nurſery Gardens, and to be had cheap enough; ſo that a Fence is eaſily rais'd with it. When other Things have fail'd, Prudence recommends the Trial of this; and though not at this Time commonly known, he will be of real Service to his Country, who contributes to make it ſo; and to ſhew by Example, the Truth of what we have propoſed.

If this Shrub cannot be had; or if the Place be ſuch that this will not grow, it will not be neceſſary altogether to give up the Trial. Shelter is as needful as even the keeping the Ground dry, and other Means muſt be attempted.

The Undertaker is by this Time acquainted with the Nature of banking. He has had it done in great Strength, and conſequently at a large Expence on the Edges of his Land; let him order it to be repeated in a ſlighter Manner, and at a ſmaller Expence in the Middle.

A Bank will at any Time anſwer the Purpoſe of Shelter and Defence, both to the Crop and the Cattle, as well as a Hedge; though it does not anſwer all its other Purpoſes.

It will be convenient for this Uſe to raiſe a Couple of Banks in ſtrait Lines along and acroſs the Land, or in any other Direction where the Courſe of the Breezes renders ſuch a Variation neceſſary. Theſe may be ſix Foot high, and juſt of a Thickneſs to ſecure them from Accidents. They will break the Force of the hurtful Winds, themſelves; but that is not all their Uſe, for they may be planted with Trees and Shrubs, which will grow upon them, though they would not upon the Flat; and thus all the neceſſary Uſes of Defence and Shelter will be anſwer'd.

Proper Care muſt be taken, that the Trees and Shrubs ſet on them are ſuch as will ſtand the Sea Breezes beſt; and thus there will be the Ground Work of a fine Plantation, uſeful and profitable for many Purpoſes, and on many Occaſions; in the ſame Act that gives the Cattle and the Crop their firſt Shelter.

In this ſmall Compaſs lies all that is needful to be done in the Ordering of Salt Marſh Land; and by theſe Means may all the Salt Marſh Land at this Time taken in thro' the Kingdom, be render'd of double Value to the Owner; and great Quantities that yet lie neglected, may on the ſame Principles be attempted with a Certainty of Succeſs. This will be adding even to the Extent of our Iſland. No Lands are ſo perfectly added to it as thoſe gain'd from the Sea; and there are in many Parts of the Kingdom great Tracts, which there requires only Spirit and Reſolution to turn to a large Account, and make to ſerve as an everlaſting Poſſeſſion to their Families who recover them. This may be ſaid with the greateſt Truth, that upon a careful Examination of the ſeveral Lands of this Kind, that have been, and that might be added to our Iſland, a great deal is recover'd from the Sea, which lay much more deſperate, than many Thouſands of Acres that are at this Time utterly neglected.

Let him who has Spirit for ſuch an Undertaking conſider this. Let him obſerve the Situation of the recover'd Salt Marſhes, and the waſte overflowed Land of the ſame Kind, and he will

ſee

ſee beyond a Diſpute or Doubt, that more Expence has been beſtow'd upon the former, than is or can be needful on the latter. He will find that thoſe Lands ſo recover'd at a greater Expence, have repaid it long ſince; and continue, and will continue for ever a very valuable Poſſeſſion: what can therefore be ſo plain, as that theſe others muſt be worth the employing that leſſer Price upon.

The Salt Marſh Land when thus recover'd and preſerv'd in its uſeful State, exceeds all others whatſoever for Paſturage. It fattens Cattle ſooner than any; and they are ſafe from the Rot, and many other deſtructive Diſorders common in other Paſtures, while they feed on it.

One Improvement there is of theſe Lands, which though practis'd in ſome Places, is far from being univerſal, though founded on the Principles of Reaſon and Knowledge. This is the letting in the Sea Water upon them at proper Times, and in due Quantity.

The Advantages of drowning Meadow Lands with freſh Water, are ſufficiently known: this anſwers that Purpoſe, but not that only. We have ſeen already, that Salt is an excellent Manure in ſmall Quantities, though it be deſtructive to all Vegetables of the Earth in too great Abundance. Why ſhould we not therefore allow it in moderate Quantity to theſe Lands, when we have it ſo eaſily, and ſo happily in our Power, by the giving them a proper ſoaking of Sea Water.

We know they owe their particular Advantages over all other Paſture Grounds, to the Effects of the Salt Water, why then will we not give it them in a due Proportion, after we have banked it out in thoſe over Quantities, in which it deſtroy'd the Land. 'Tis very certain, that in a due Proportion Sea Water will add to the Fertility of theſe Lands; and it is eaſy in the Ordering of their Banks and Fences, to provide for the letting it in at a proper Seaſon, and in due Quantities. This I would have every one who is concern'd in Salt Marſhes conſider, and he needs not doubt but he will by a prudent and careful Obſervance of it, improve his Grounds above all thoſe of his Neighbours.

'Tis upon the Sea Coaſt that the largeſt Advantages are to be made by taking in Land for theſe Purpoſes; and this is practicable with the greateſt Certainty, and at the ſmalleſt Expence. Where the Owze is firm, and bears a tolerable Shew of Graſs when the Tide is out, here the Expence is eaſier, and the Succeſs more certain.

They have in many Places taken in the Owze where 'tis ſoft, and cover'd at low Water with Sea Weeds. This will come dearer, and be ſubject to more Diſadvantages: it is therefore certain and plain, that the other may be done more to the Profit of the Undertaker, in Places where Nature favours the Attempt.

When any one ſhall determine upon this Work of recovering new Land from the Sea, he is to conſider the Nature and Subſtance of the Owze, according to the Characters juſt given of Firmneſs, or Softneſs; and to conduct and carry on his Work accordingly: for in one Caſe the Bank may be made of the Owze itſelf, and in the other, the Matter of it is to be dug upon the Land beyond where the Bank is to be rais'd; and this makes a great Difference.

The firm Owze may be taken up, and rais'd directly into a Bank of due Height and Proportion, for it will dry and grow ſolid in the working. Whereas the wet, ſoft and muddy Owze, cannot be wrought into a Bank, or if it could, would not have Strength to ſtand againſt the Force of the Water.

There is alſo another great Reaſon why the Bank may be made of the hard Owze, and the Earth dug from under it, whereas it cannot, nor muſt, of the ſoft; and this is the different Effect the Sea will take upon a Hole being open'd in one and in the other Kind. When a Hole is made, though ever ſo large, in the hard Owze, the Sea can take no hold upon its Edges, ſo that it does not increaſe in Bigneſs; and as the Ground is firm underneath, it cannot burrow deeper. As this is the Caſe, the Hole is by Degrees filled up by the Sand and Refuſe waſh'd into it by the Water; and ſometimes the Place is render'd level, as if there had never been any Thing done there.

On the contrary, when a Hole is thus dug in the ſoft and muddy Owze, it enlarges continually by the Action of the Water; and if it have been carry'd to any Depth, burrows underneath a great Way. Therefore if any ill-contriving Undertaker ſhould go to work upon a wet and muddy Owze, digging from before the Bank, what he employ'd in raiſing it, he would not only find it very difficult to get a Bank rais'd of ſo bad Materials, and would perceive it to be very bad when made, but the Sea continuing to burrow deeper and deeper in the Hole out of which that Matter was taken, would by Degrees undermine the Bank, and all the Labour would be loſt, and the Expence that had been employ'd ſo unſkilfully, thrown away.

This ſoft Owze may be taken in, and has been, very often to great Profit; the Earth of which the Bank is made being dug within: and if this be the Caſe, as is ſeen by Experience, to how much greater Advantage muſt the other always anſwer.

The Land thus recover'd where there is a firm Owze, is always better and richer than where it has been wet and muddy; and produces a better and more wholeſome Paſturage: and in this Caſe it retains its former Level, either entirely or very nearly, ſhrinking if at all, very little; whereas the other will often ſink two Foot or more in drying.

The ſoft or muddy Owze is found by Experience, to be a better and richer Manure for other Lands than the firm; but that is no Objection to what is juſt aſſerted, and what Experience confirms of the greater Fertility of the dry; for we have ſeen in the Conſideration of Manures in its proper Place, that many Things ſerve excellently for the giving Richneſs to a Soil, which will not afford Nouriſhment to Plants themſelves.

CHAP. X.

Of Hedges.

MANY Things have been already ſaid, occaſionally, of Hedges, reſpecting their ſeveral Advantages in Incloſure, and the Benefits which both the Herbage and the Cattle receive from them, in a ſecondary Way, by their Defence and Shelter: we now come to the more immediate and full Conſideration of them.

No Article whatſoever, in the Huſbandman's whole Concern, is of more Importance to him than that of Hedges: they are the firſt Object that naturally ſhould ſtrike his Imagination, as they are the Defence and Guard of all the reſt. We have ſeen how much incloſed Land is preferable to ſuch as lies open; and as this Advantage is originally owing to Hedges, it will be the greater or the leſs, as they are better or worſe managed.

In all incloſed Lands the Farmer muſt keep up a good Fence, if he expect to reap the Fruit of his Labours. For it is by this that his Crops are ſecur'd from external Injuries. 'Tis evident therefore, that the better and the more perfectly the Fence is kept in Repair, the greater will be his Security of his Profits: and we may add, that the Conſequences of one little Defect may do him more Injury, by letting in Cattle upon his Crop, than would have been the Coſt of a moſt perfect and thorough Repair.

As Hedges are the general Fence, it becomes the practical Huſbandman to beſtow his greateſt Care and Thought upon them; a great deal may be ſaved or loſt by a proper or improper Management of them: and in order to make the greateſt Advantage of them, he muſt do ſomething more than follow the common Tract of others: for there is no Part of their Buſineſs in which the Farmers of ENGLAND are generally more deficient.

There are many Shrubs of which Hedges may be made, but there is one Kind almoſt univerſal, that is, the white Thorn. For one Hedge of any other Kind one ſees a thouſand of this. And there is Reaſon for the Preference; for none ſucceeds ſo well, or anſwers the Farmer's Purpoſe ſo perfectly, where the Soil will ſuit with it, which it does throughout moſt Parts of ENGLAND, without Exception.

In ſuch Places as this generally us'd Shrub will not agree with, the Holly, black Thorn, Elder, Furze, and ſeveral others, to be mentioned hereafter, are to be called in; but the common Method is with this. When the Hedge is made with white Thorn, the careful Huſbandman will not think it finiſhed when he has ſet that alone; he will plant in it, at proper Diſtances, Timber, or Fruit Trees, and they will riſe to a conſiderable Profit; but this, like all his other Advantages, will be proportioned to the Care he employs, and to his Attention to the Rules laid down for that Purpoſe.

As to Timber Trees, he is not to plant any at random, for one Kind ſuits one Soil, and another another: nor is there any one that may not be very valuable to him if it be rightly manag'd. In the firſt Book of this Work, where Soils are named, there are general Obſervations laid down of the Trees with which they ſeverally agree beſt: but as the ſucceſsful Growth of theſe depends upon the Depth, as well as the Nature of the Soil; and on many other Accidents, it will be proper for him who is about to plant an Hedge, to begin with obſerving what Trees flouriſh beſt in the Hedges of his Neighbours; for thoſe it will be his beſt Practice to plant in his own.

The Aſh about BRAMPTON in NORTHAMPTONSHIRE, not only thrives better than elſewhere; but it thrives better than any other Kind of Tree in that Place: and the Huſbandman will have three Times the Profit from that he can expect from any other, when he falls upon a Soil that ſuits it in that Degree.

He is in the ſame Manner to ſtudy and obſerve the reſt, taking for his Hedge ſuch as he ſees thrive moſt freely on the Soil: for there is more Profit in the meaneſt Tree, where it thrives, than in the beſt Kind, when it is ſtarved.

In ſome Places it is a Cuſtom to plant Fruit Trees in the Hedges, and they thrive as well as in Orchards: Elſewhere it may be proper to plant Crabs, and Pear-ſtocks, for the Uſe of the Orchard, in grafting Apples and Pears. Even the white Thorn itſelf, is not without its Uſe beſide that in the Fence; for its Root, when of a certain Age, is knotted and veined in a moſt beautiful Manner, and ſerves the Cabinet-makers for many of their elegant Works. This is a Thing mentioned in all the old Books upon theſe Subjects, yet ſo little Advantage is made among us, of what has been written for that Purpoſe, that every body has wonder'd what the STILTON Cabinet-maker made his Tea Cheſts and other Works with, when his only Wood was the white Thorn Root. He had the Secret, as it was call'd, many Years to himſelf, but at this Time it is common in LONDON.

The Huſbandman being thus far advis'd, as to the planting of uſeful Trees in his Hedges, we ſhall return to the Subject itſelf; and as the white Thorn Hedge is the moſt univerſal, it will be proper to begin with that, treating of the others afterwards.

CHAP. XI.

Of raiſing the Quickſets for a white Thorn Hedge.

AS this is a very important Article to the Huſbandman, we ſhall take it from the Beginning, ſetting out with his preparing his Sets before we advance to his planting them in his Hedge. In order therefore to accompliſh the Taſk, we ſhall begin ſometime before he intends making his Hedge; for by thus preparing, in Time, he will have all in perfect Readineſs; and ſave the Expence of buying what he may raiſe for himſelf.

Now as he will want, in due Time, a good Quantity of white Thorn Plants, or Sets, let him prepare for them in this Manner. Let him make Choice of a ſquare Piece of Ground, any waſte

Corner will do; and, to chuſe, it ſhould be upon a poor and dry Soil. This he is to uſe as his Nurſery. It muſt be within a good Fence, that Cattle cannot get into it; but there requires no other Care, except that it ſtand defended from the North and Weſt.

In November let this be plowed up, and prepared for the Seeds, and early in the ſucceeding Spring let them be ſown; the Ground having been well weeded during the Winter. The Manner of ſowing them is this.

Let Furrows of five Inches deep be made, at two Foot diſtance, and in theſe ſow the Seeds of the common Haws, gather'd the Autumn before, and kept dry during the Winter. When the Seeds are evenly ſprinkled in, cover them with a Rake; and then leave them to the Time of their ſhooting, which is not till the ſecond Year.

As ſoon as they appear above the Ground, weed them carefully between the Rows, and immediately after give the Ground a good watering. And repeat this weeding and watering at Times, as ſhall be found neceſſary, till the young Plants are got up to a tolerable Height, and their Stems at the Bottom are about as thick as a Man's Thumb.

That is the Size at which they are fitteſt for Uſe. They are to be left ſtanding in this Nurſery till the Bank is prepared for their Reception, as ſhall be directed in the following Chapter; and they are then to be cut off, within five Inches of the Ground, and carefully drawn, that their Roots be not injur'd.

Inſtead of a Nurſery ſome ſow the Seeds of the Haws in their Coppices, the Year before they fell their Underwood; and the young Sets are thus got ready for Uſe without damaging the Wood, or taking up any particular Piece of Ground.

Some alſo prefer raiſing their Sets from Plants, the Seed being a tedious Method of obtaining them. But the Sets are always faireſt and beſt from Seed.

Whichſoever of theſe Methods the Huſbandman chuſes, let him take Care to be provided with a ſufficient Quantity of Sets, of a proper Size, againſt the Time when he ſhall want them; and then the Work is eaſy.

CHAP. XII.

Of the making the Hedge.

THE Huſbandman having thus furniſhed himſelf with a ſufficient Quantity of Sets ready for his Purpoſe, is to take a View of the Ground, and examine its Soil and Situation, that he may know in what Manner to ſet about his Work.

In ſome Places a Quickſet Hedge alone is ſufficient for the Purpoſe; in others a Ditch is neceſſary: this laſt is by much the moſt general Condition; we ſhall therefore enter at once upon the Conſideration of this Kind; the Management of the other being, in a Manner, included within its Directions.

The firſt Thing to be done is to mark out the Courſe of the Ditch, and its Breadth. It is to be three Foot wide at the Top, and its Depth is to be two Foot. Some dig the Sides perpendicular, but that is liable to many Inconveniences; for the Rains will waſh in a great deal of Dirt from the Edges; a great deal more will be thrown in by the Cattles trampling about it; and they can walk and turn about conveniently in it; ſo that they will be continually in the Ditch, and cropping the young Shoots of the Quick.

To prevent this, the Cuſtom of making the Sides ſloping, and the Bottom narrow, was invented, and it is preferable to the other Method on all Accounts. It is beſt to allow but a Foot breadth at the Bottom of the Ditch, when it is a Yard wide at the Top. This will give ſuch a Slant to each Side that the Edges will not ſo eaſily break in; and will cramp the Legs of the Cattle ſo, that as they can neither walk eaſily, nor turn about in the Ditch, they will not get that Habit of going into it.

The Breadth and Depth already-mentioned are, in general, ſufficient for the Ditch in a common Incloſure; but where, from any particular Circumſtances, it is judged convenient to make it larger, it muſt be carried on in the ſame Proportions.

When the Breadth of the Ditch is thus mark'd out, let the Labourer be ſet to dig; and that he may prepare the Bank properly for the Quick that is to be ſet on it, let him lay the Turf regularly, with the graſſy Side downwards, upon that Side of the Ditch on which the Hedge is to be raiſed.

Upon this Turf, thus turn'd Bottom upwards, let him ſpread the beſt of the Mould; and haveing thus prepared a Bed for the Quick, let the firſt Row of it be brought in and laid.

Let the Sets be well choſen, let them be ſtrait, ſmooth, even-growing Shoots, and well-rooted: and let them be brought freſh taken up. The Huſbandman ſhould have his Eye upon every Article of this Account, for his Succeſs will depend upon his Regard to the ſmalleſt Particulars. The Beauty of his Fence will be altogether owing to the Choice of the Shoots, and their Growth will alſo, in a great Meaſure, depend on the planting.

The Bank being thus far prepared, and the Quick ready, let it be laid carefully in. The Sets muſt be laid on this Bed, at a Foot diſtance; and with the End inclining a little upwards. This is the Method of planting the Hawthorn, or Quickſets; but this is not all that is to be done: The Fruit, or Timber Trees, are to be planted at the ſame Time with the Quick, elſe it will make a Diſturbance.

Let the Courſe of the Bank be meaſured, and at every thirty Foot make a Mark. At each of theſe Marks plant a thriving young Tree of Oak, Aſh, Elm, or whatever Kind is found to ſucceed beſt in the neighbouring Soil; or of ſuch Fruit Trees as will agree with it, taking Care to ſet it upright and ſteady.

One Row of Quickſets being thus laid, let them be cover'd well with ſome more of the beſt Mould; and upon this let there be laid a Covering of Turf, turn'd Bottom upwards, and laid even, and in a workman-like Manner.

Upon this Turf ſpread another Covering of the

the beſt of the Mould, to make a Bed for a ſecond Row of Quick. This Bed is to be in the whole a Foot thick over the firſt Row; and when the Bank is well rais'd to this Height, another Parcel of Sets are to be brought freſh, ſtrait, and well rooted as before directed. Theſe are to be laid in the ſame Manner as the firſt, with the Ends inclining a little upwards, and placed at a Foot Diſtance one from the other; each being laid in the Middle of the Space that is between every two of the firſt Row.

When theſe are carefully laid, they muſt be cover'd with more good Mould, three or four Inches thick, and then the Soil that is dug out of the Bottom of the Ditch, is to be laid over this Earth, and the Bank finiſhed with it.

The Ditch is now dug, and the Earth thrown up is all employ'd, the Quickſets and young Trees are planted, and the Bank is made. The Hedge and Ditch therefore are finiſh'd, and there requires nothing more to be done, but to ſecure them from Injuries.

The very Form of the Ditch has been ſo contriv'd, as to defend the young Quick from being eaten up while ſhooting, but there requires more than this to be done for its Preſervation: it muſt be defended from the trampling of Cattle, and in ſome Degree ſhaded from the Sun. Though the Cattle would not come into the Ditch to eat it up, they would climb over ſuch a Bank as this; and deſtroy all the Work; and the full ſcorching Sun upon the young Sets, would be too powerful without ſome Shade.

For the Defence and Shelter of theſe Sets, a dead Hedge is to be made at the Top of the Bank. This is a Hedge of dead Wood faſten'd by dead Stakes, which being well wrought together, will ſtand very ſecurely, till the Quick is of ſuch a Height and Strength, as to need no Defence upon its own Account; and to be a ſufficient Incloſure to the Land.

For the dead Hedge a proper Quantity of Buſh Wood is to be provided, and a proportionable Number of Stakes. Theſe are the better the ſounder Wood they are made of; and therefore none is better than Oak for the Purpoſe. If Oak cannot conveniently be had, Sallow will anſwer the Purpoſe very well; for this, though a light Wood, is firm and durable; and is found by Experience, which is the only Thing to be rely'd upon on theſe Occaſions, to exceed all other Wood, the Oak alone excepted.

The Materials being thus prepared, the Stakes are to be firſt driven into the Ground: they are to be of ſuch a Length, that they may be thruſt quite through the Bank into the firm Earth below, and enough remain above for the Service of the Hedger; if they do not penetrate four or five Inches into the Soil under the Bottom of the Bank, the whole Hedge will ſtand but an ill Chance.

Theſe Stakes muſt be driven in at two Foot and a half Diſtance, and the Workman ought to ſee that each ſtands firm and faſt. Then let him begin the Hedge. He muſt lay the ſmall Buſhes at the Bottom in ſuch a Manner, that they may cover the Quick when it firſt ſhoots, and be a Defence to it againſt the Bitings of Cattle, that may chance to get down into the Ditch. This is the firſt Care: after this the long Buſhes are to be laid in, and the longeſt of all at Top twiſting them in between the Stakes.

When the Hedge is thus carry'd to its due Height, let a Parcel of long and ſlender Poles be provided, and the Tops of the Stakes bound in with them on each Side; this is what is called in the Country Phraſe, eddering a Hedge: and this finiſhes the Work.

But in order for more full Security, as the Stakes may have been moved in the making up of the Hedge, the prudent Huſbandman will ſee them all well driven again. A few Inches more in Depth gives them now a great Strength, and the Hedge is thus ſecur'd againſt all Accidents, and will ſtand with Eaſe the full Time it is wanted.

CHAP. XIII.

Of the Seaſons for planting Quickſets, and the Choice of the Kinds.

THE Huſbandman has ſeen in the preceeding Chapter, the compleat and exact Method of making a Quickſet Hedge: we ſhall now lay before him ſeveral Particulars relating to the Time for his making, and repairing his Work; the Choice of his Seeds; and other ſuch Particulars; which, although ſome of them may appear leſs important, are all worth his ſerious Conſideration.

There are two Seaſons in the Year for planting a Quickſet Hedge, and only two, for it will not ſucceed in any others. Theſe are early in Spring or late in the Autumn.

For the Spring planting, the laſt Week in FEBRUARY, and the firſt in MARCH are the beſt; for the Autumn, the whole Month of OCTOBER, and the firſt and ſecond Week in NOVEMBER: a Quickſet planted at either of theſe Seaſons will grow, but by what I have ſeen from frequent Experience, I prefer the Spring Plantation. I have always made my own Banks for Quick in the firſt or ſecond Week in MARCH, and advis'd the ſame to my Friends; and I may boaſt, that no Perſon whatſoever has planted Quick with more Succeſs.

Two or three Times in my Life, I have try'd the Practice ſo ſtrongly recommended by ſome, of laying in three Rows of Quick into the Bank inſtead of two, but I have never found it ſucceed ſo well. They require that the Bank ſhould be of an unſeemly Height, to keep them at a due Diſtance: and if this be not done, they ſtarve one another.

The Roots of white Thorn ſpread a great Way, as I have ſeen by repeated Experiments; but a great deal of the Nouriſhment is for the firſt three or four Years taken up near the Stem, and in this Caſe the three Rows blend their Roots together, and deſtroy the Growth of each other. Of this I am certain, more Wood will be produced in the ſix firſt Years from two Rows, than from three.

In Places where the young Quick will be too much expoſed to Cattle, there muſt be a dead Hedge on the Edge of the Ditch, as well as on the

the Top of the Bank. This is an additional Expence, but it keeps the Work ſecure, and gives the Quick Leave to ſpring without Moleſtation; and the Succeſs is always ſpeedier, as well as greater.

When the Quickſet Hedge is to be made without a Ditch or Bank, the Plants are to be diſpoſed in a different Manner from that uſed in the common Way of working. They are to be ſet nearly upright in two ſtrait Rows by Line, and about a Foot Diſtance one from another. They will thrive this Way very well; but ſhould be fenced with a high dead Hedge on both Sides, for they are more expoſed to Miſchief of every Kind, than the others.

Moſt Soils and Situations will bear the Hawthorn, and whenever it will thrive tolerably, it is preferable to any other Shrub by way of Fence. Where there is too much wet, or where the Soil is perfect Sand, it does not ſucceed; but for theſe Places other Shrubs will be propoſed in the ſucceeding Chapters.

If the careful Huſbandman will look into the Hedges, he will ſee there is a manifeſt Difference among the Hawthorn Shrubs; ſome having more ſome fewer Branches; and ſome much larger Leaves than others. As I have adviſed him to have a little Nurſery for the raiſing his Sets, I ſhall here add a very material Piece of Advice, though little regarded in general; that is, that he gather the Haws for Seed himſelf, and that he take a particular Notice from what Shrub he gathers them.

He will find that the Hawthorns with ſmalleſt Leaves have the moſt Branches, and the greateſt Number of Thorns. Theſe therefore will be ſure to make the beſt Fence: and I have obſerv'd, that they are the ſturdieſt, and leaſt liable to Accidents while young.

Let him gather his Haws when they are well ripen'd, from one of theſe ſmall leaved buſhy Shrubs, the ſmaller leav'd and more buſhy, the better; for the Sets will follow the Nature of the Parent Tree, or improve upon it; eſpecially as I have directed the Nurſery for the raiſing them to be upon a poor Piece of Ground: for Richneſs in the Soil tends to throw the Nouriſhment in all Shrubs into the Leaves, and not into the woody Part.

One Reaſon therefore of having the Nurſery upon a bad Piece of Ground is, that from the Seeds of a buſhy ſmall leav'd Hawthorn, the Sets may continue of that Kind; but there is another much more material, which is, that on this Circumſtance depends in a great Meaſure their thriving in the Hedge. For this is a certain Rule, that young Trees when they are taken out of a rich Soil, and planted in one that is poor, never thrive well: and on the contrary, ſuch as are tranſplanted out of a poorer Soil into a richer, grow ſurprizingly. Now the Banks on which Quickſets are planted for Hedges, rarely are of an over-rich Soil; ſo that the Way to have the Sets thrive, is to raiſe them in one that is yet poorer.

The Poorneſs of the Soil is alſo the more needful, in order to raiſe the buſhy Hawthorn from its Seed without Failure, becauſe this is not a diſtinct Kind of Hawthorn, but only what the Curious call a Variety; ſo that if the Seeds of this be ſown in a mellow rich Land, they will produce a ſtragling, looſe, and large leav'd Shrub, as I have ſeen by Experience.

CHAP. XIV.

Of keeping the Hedge in order.

THE Method has been now laid down, not only of making a Hedge; but of doing it in the moſt profitable Manner, in reſpect of every Article in that Concern. We will ſuppoſe it now made; and proceed to the neceſſary Care of it under its natural and accidental Damages.

The next Spring after the laying of the Quick, let the Farmer go over the whole Bank with a careful Eye. Firſt examining the dry Hedge at Top, whether it be firm in every Part. If he find it looſe any where, let this be remedied by driving a new Stake, or faſtening the old ones: and if any other Deficiency appear, let him ſee it repair'd in the ſame Manner. A very ſmall Expence will do this the firſt Year, whereas it might be ten-fold the next: and the going over it at the End of one Year in this careful Manner, will often ſecure it for its Time.

When he has rectified what was amiſs in this, let him view deliberately and ſeparately, the Quickſets. Some of theſe, in Spite of all his poſſible Care, will fail; ſo that he will on this Examination find ſome dead, and others in a declining Way. He muſt now ſee freſh Sets put in the Place of the dead ones; and trim up the others with due Care.

Some adviſe the Planting the Fruit or Timber Trees in the Hedge at this Time; and others recommend the doing that, when it is at two, three, or four Years Growth: but from what I have ſeen in Practice, I greatly prefer the planting them at the making of the Bank, at the ſame Time with the Quick: for thus they take their Growth together; and there is no Diſturbance of the Fence, as there muſt be in planting them when all is ſettled.

Before the Farmer takes a View of his young Quickſet, let him order it to be weeded. This muſt be done carefully and thoroughly: and it muſt be repeated at Times, for the Quick, while it is young, ſhould have all the Nouriſhment the Ground can yield, and not be ſtarved by the Weeds. This clearing will give the Owner a diſtinct View of the Condition of the Sets, that he may know what to ſupply.

At this Time while the Shoots are young, too much Care cannot be taken to guard them from Sheep: for they are very fond of the tender Buds: and their cropping them at this Period of their Growth, is particularly deſtructive.

If by any Accident Sheep have got at it, or other Cattle, it will be diſcover'd by the Tops being eaten off, and crop'd irregularly, and mangled at the Ends. In this Caſe there is but one Method to reſtore any Hope of a good Hedge: the whole Growth muſt be evenly cut off, within an Inch and half of the Ground; and there will then be a new and freſh Set of

Shoots that ſpring, which would not have happen'd from the gnaw'd Ends, at leaſt not with any Degree of Regularity or Beauty.

If the Weather have been unfavourable, or the Soil too poor; or if from any other Accident the Shoots are perceived to be weak and bad: the ſame Practice is to be obſerv'd as in the other Caſe: they are to be cut off within an Inch and half of the Ground. This will give the Roots new Strength; and the ſecond Shoot which follows this, will not be ſo faint. I have ſeen a very languiſhing Quick perfectly reſtored by this Method.

From this Time very little Care is required till the Hedge is of a Growth for plaſhing; this is not till eight or ten Years after the Planting, and is an Operation that ſhall be treated of ſeparately in another Chapter. But though little Care be required during the firſt Year's Growth of a Quickſet, leſs than that little uſually is taken, for many give themſelves no Trouble about it at all.

Let the induſtrious Huſbandman do otherwiſe. Let him from Time to Time look to it; and remove its Redundances, and ſupply the Defects. Let him with his Knife take off ill-ſhap'd and ſtragling Branches. Let him ſee that no unneceſſary dead Wood be left at the Bottom, for that will choak the Quick. And let him carefully root up all thoſe tangling Weeds, which are ſo common in Hedges, and at once ſpoil their Beauty, and injure their Growth.

The principal of thoſe Weeds which are deſtructive to Hedges, are four. White Bryony, Black Bryony, Travellers Joy, and Bind Weed: theſe all cover the Hedges to a great Extent.

White Bryony has Leaves like a Vine, and red Berries. The Root is as big as a Man's Leg, and whitiſh; it muſt be dug out deep, for it runs a great Way into the Ground; and if any Piece be left, will ſhoot from it. Black Bryony will grow thirty Foot long, and entangle and choak the Quick all the Way. It has Leaves like a Heart, and the Root is thick, black on the outſide, and white within. It muſt be dug up like the former.

Travellers Joy has woody Stalks, and ſpreads a great Way. The Leaves are ſmall, and of a pale Colour; and it bears white thready Tufts in Autumn. It is more deſtructive of the Quick than any of the others; over ſhadowing it in the Manner of an Arbour. The Root of this is not large, nor lies deep like the others; but the Farmer muſt take Care he gets it up entire, for the leaſt Piece of it will ſhoot again; and the Buſh is of quick Growth.

Bind Weed is the ſmalleſt of theſe Weeds, but it will crawl among the Branches to fifteen Foot length; it has Leaves ſhaped like the Head of an Arrow, and bears in July large white Flowers like Bells. The Root of this Weed is ſlender and white. It does not go deep, but runs a great Way under the Surface of the Ground; and ſhould be got out entire, for the leaſt Piece of it will grow, and ſend up new Stalks.

All theſe Weeds ſhould be watch'd in their young State, and tore up before they come to flower or Seed; for after that there will be an eternal Brood of them: but if they be thus deſtroy'd, all the Farmer will have to do is, to watch the Riſe of ſuch as come from chance Seeds, and they are but few.

By theſe Directions; but chiefly by keeping a watchful Eye from Time to Time upon the Growth itſelf, the Farmer will raiſe his Quickſet Hedge in Strength and Vigour: and by as much as it is handſomer to the Look than thoſe of his Neighbours, ſo much it will be better, and more healthful. We ſhall now leave it to grow to the eighth Year, or thereabouts, and then proceed to the Plaſhing of it.

CHAP. XV.

Of Plaſhing a Hedge.

THOUGH the Plaſhing of a Hedge is to be firſt perform'd at about eight Years Growth, this is not the only Time. It is to be repeated afterwards at different Periods; and as there is more Art requir'd in this when an older Hedge is be plaſh'd, than when it is a young one, we ſhall beſt inſtruct the Huſbandman in doing this to the greateſt Advantage, by deſcribing the Method to be obſerv'd when it is old. What is to be done in plaſhing of a Hedge of twenty, or five and twenty Years old, includes all that can be needful to know for doing it on one that is younger; but on the contrary, more is required for the old than need be done to the young.

We will ſuppoſe the Hedge planted and dreſſed, as already deſcrib'd, to be grown to five and twenty Years ſtanding. It will by this Time be looſe and irregular in its Growth, there will be Vacancies at the Bottom, and Gaps in many Places, and it will be full of thick and old Stumps, and Stubbs, as well as of young Shoots. Theſe latter only are for Uſe: the others are to be cut up, for they encumber the Hedge, and prevent the Growth of better Wood.

Upon a View of the Condition of the Hedge, the Huſbandman is to conſider in what Manner he is to go to work. The Stubbs are declared uſeleſs already; but among the reſt he muſt conſider, that he is to reſerve ſome Shoots for laying down, and others to ſerve by way of Stakes. For the firſt Purpoſe he is to ſelect thoſe which are longeſt, and freſheſt; and ſuch as are of a middle Growth: for the Stakes, he is to leave ſuch as are ſomewhat larger, and ſtand properly, and grow tolerably ſtrait for the firſt five or ſix Foot: it matters not for the reſt, becauſe they are to be cut off at that Height: their Uſe requiring no more.

When the Huſbandman has thus conſider'd, let him go to work. He is to cut away all the old Stubbs within two Inches of the Ground, ſtriking them off ſloping. After this let him go on thining his Hedge, by cutting away all but the proper Shoots for Stakes, which he is to ſtrike off at the Height he deſigns his Hedge, and the long Shoots for laying, which he is to leave entire.

As there will not be enough of theſe Shoots

for Stakes, growing as they ſhould do; he muſt make ſome others to drive into the Ground, where there is a Deficiency.

When the uſeleſs Stuff is thus cut away, a Spade may be got between the Shoots; and the Labourer is to be employed to clean away and new make the Ditch. Let him dig this juſt as it was at firſt; making the Top wide, the Bottom narrow, and the Sides ſloping.

As he is at work upon this, let him clean away all Filth from about the Roots of the Quick; and where the Earth has moulder'd away from them, add ſome of the beſt that comes out in digging the Ditch, preſſing it well into the Hollows. It is impoſſible to conceive, but from one's own Sight, what a Refreſhment this cleaning and digging of the Ditch, gives to the Roots of the Shrubs. A vaſt many ſmall Roots are cut off, and they might be ſuppoſed hurt, but they ſoon ſend out many more. The ſtirring of the Earth about them is of vaſt Service; and thus the Roots having a greater than ordinary Supply of Nouriſhment, and having a ſmaller Quantity of Wood to feed, that which is left flouriſhes ſurprizingly.

A great deal of the better Mould from the Ditch, will be thus us'd in filling up Holes, and facing of the Bank, the reſt is be laid at the Top: for if the Sides be loaded they will break with the Rains, and what falls off will choak up the Ditch. And as it would be only hurtful thus laid on the Sides: it is of great Service when laid on the Top, heightening the Bank, and greatly improving the Fence. The Labourers don't like to hear of this, becauſe it gives them more Trouble, but it is the Maſter's Buſineſs to ſee it done. He who pays them is not to ſuffer by their Idleneſs.

We have directed, in the making of the Hedge, that either Fruit or Timber Trees ſhould be planted at proper Diſtances. Theſe the Huſbandman is to leave ſtanding among his Shoots. They have nothing to do with the Hedge, though they grow among it; and they are to be lop'd in the uſual Manner, if Timber Trees: and if Fruit Trees, to be prun'd up above the Reach of the Cattle: and all that is to be done to them at theſe Repairings of the Fence is, that partly by this pruning, and partly by ſtaking, if neceſſary, they are to be brought to ſpread and lean over the proper Ground, where both Sides of the Hedge are not the Owners.

The Ditch is now clean'd, the Bank repair'd, and the Stakes ready. Let the new ones be well and firmly driven, where there are not a ſufficient Number of the upright Shoots left for that Purpoſe: and theſe being diſpoſed, the Work is ready for the Plaſher.

He is to take each of the long Shoots which be left ſtanding ſeverally, and bending it gradually he is to give it a ſloping Cut with his Bill half through; it will then fall eaſily, and he is to weave it in between Stake and Stake carefully.

When he has thus work'd in all the Shoots left for that Purpoſe, he is to go over his Work, and trim off the ſtraggling Sprigs, to render it uniform and even.

A great deal of the Succeſs of this Work depends upon the Method of laying theſe Boughs, when they are cut through ſo far as to obey the Hand of the Workman. If they be laid too low and too thick; as many do, thro' an Opinion of its ſtrengthening the Hedge, the Sap is all ſent into the Shoots; and the Plaſhes ſtarve and will decay. On the other hand, if they be laid too high, then they draw in all the Nouriſhment; and the Shoots are ſtarv'd. Both theſe Accidents are to be avoided by a middle Courſe. It is not the Farmer's Intereſt to ſtarve the Shoots to feed the Plaſhes, nor to ruin the Plaſhes for the Shoots: he is to derive a proper Quantity of Nouriſhment into both; and this will be done by laying them in a middling Way. Beſide this has another Advantage; that if the Plaſhes are not too deep cut, and are laid thus evenly, or nearly upon a Level, the Sap is not all directed to their Ends, but ſends up Shoots from every Part.

This Abundance of young Shoots will alſo be promoted by the proper cutting of the Branches of the plaſh'd Boughs. They are to be cut off ſhort, at five or ſix Inches length on each Side of the Hedge; and this will make them ſend out Side Shoots of their own, as well as promote the Growth of the others, to the great Beauty and Strength of the Hedge.

Many have a Cuſtom of making their Hedges too high: but this is wrong for ſeveral Reaſons. Let the Bank be rais'd carefully and firmly; and let the Hedge be made juſt high enough to ſerve as a Fence, and no more; for it will quickly raiſe itſelf higher: and always in thoſe Hedges which are too high, the Quick is ſtraggling at the Bottom. The lower the Hedge the more free the Shoots always grow, and the thicker and cloſer the Fence is at the Bottom.

A Hedge muſt be of a conſiderable Growth to require this full Care and Nicety in the plaſhing: when it is younger the Buſineſs is done with more Eaſe and leſs Ceremony: but on the other hand, the Huſbandman has ſometimes to do with an Hedge that is too old to be repaired by plaſhing, with all the Care he can take; or by the niceſt Obſervations of theſe Directions.

In this Caſe there is but one Thing to be done. Let him cut up all the Stubs, and make a good dead Hedge on each Side, to ſecure the young Shoots that will riſe, till they are of a proper Height to plaſh. As there will be Vacancies between ſome of the Stubs, theſe are to be ſupplied by freſh Sets, which will grow up with the Shoots from the Stumps, and the dead Hedges are to be kept in Repair till theſe are of an Height to be uſeful.

When an Hedge is new plaſh'd it ſhoots out very vigorouſly, and theſe freſh Branches tempt the Cattle. It is therefore always beſt, if the Field can be kept from feeding the firſt Year at leaſt. If it can be kept for mowing, this anſwers ſome Purpoſe, but if plowed, it is of twenty Times the Service; becauſe that ſtirring and turning up of the Ground gives Vigour to the Roots of the Quick, and forwards the Shoots prodigiouſly.

This may inſtruct the Farmer to ſuit his ſeveral Buſineſſes to one another. He is never ty'd down to a particular Year for the plaſhing of an Hedge: let him therefore take the Opportunity of doing this when the Ground is to be plowed,

plowed, at leaſt when it is to ſtand for Hay.

If he cannot do this; for Things will ſometimes fall out croſly, let him remember what Cattle are moſt and what leaſt miſchievous, that if he muſt feed the Ground it may be to the leaſt Diſadvantage that may be. Horſes, of all other Animals, are leaſt apt to crop the Quick. Cows and Oxen are too fond of it: but Sheep moſt of all. They are therefore to be kept out of the Ground, for the firſt Year at leaſt if poſſible, with any Degree of Conveniency.

As to the Seaſons of plaſhing of Hedges, there is but one proper. Some do it in October, and pretend particular Advantages from that Time: but let the Huſbandman truſt to Experience, and aſſure himſelf that the only right Seaſon is the Month of February.

While the Hedge is growing up from the plaſhing, it will be proper to have the ſame Eye upon it as at firſt; taking Care, in Spring and Fall, to cut away the ſtraggling Branches, and to root out Weeds: thus the Fence will grow regular, thick and clean; and from this renewing, in the ſame Manner as from its firſt Riſe, will exceed, in every Reſpect, thoſe of the Neighbourhood, which are not looked after with the ſame Degree of Care.

We ſhall add only two or three ſlighter Admonitions here, and then conclude this Chapter. When the Hedge is plaſh'd, the Shoots laid down, and wove in, and the ſtraggling Branches of them are going to be cut away, let there be a Reſerve made of the fineſt, tougheſt, ſlendereſt, and longeſt of them. Inſtead of cutting theſe away let the Workman bend them to his Purpoſe, and to that End give them a Nick at the Bottom, if neceſſary, and then bind in the reſt with them. This finiſhes the Hedge beautifully and durably. After this the whole Work may be, at Times, over-looked, the dead Stakes driven a little down, and the plaſh'd Boughs preſs'd alſo gently lower: all which will make the Hedge more firm and durable: and where from Neceſſity, or Accident, there is no keeping Cattle away, it is a good Practice to ſcatter ſome dead Thorns over the Top of the Hedge, and about its Bottom, by way of Defence, till the young Shoots have ſome Strength.

When in a very old Hedge the Stubs are ſo large that they break in upon the Uniformity of the whole, and are liable to make Gaps by the Cattle getting by, at one Side or other of them, the Method is to cut them ſo nearly through by the Ground, that they may be bent down; they are then to be ſway'd till they can be laid ſlanting, the Head of one upon the Stump of another; and the natural Vacancy in the Slant is to be fill'd up with the Side Shoots. By this Method, and by keeping the Bank high, and in good Repair, a Fence may be made out of very unpromiſing Materials; but in general it is better in theſe Caſes either to cut down the Stubs, as before-directed, making a dead Fence on each Side, waiting for a freſh Shoot from the Roots; or elſe when the Caſe is moſt deſperate of all; as when the Roots are extreamly old, and ſtand very ſtraggling, to ſtub the whole up entirely, and begin from the Foundation, making a new Quickſet as firſt directed.

CHAP. XVI.

Of the Profits that may be made by Hedges.

So familiar and ſo eaſy is the making and preſerving a Quickſet Hedge, according to the known Methods, when the Huſbandman will be careful to enquire by reading, and by queſtioning his Neighbours, what all thoſe Methods are; and will be induſtrious enough to ſee them all put, in a proper Manner, in Execution, under his own Eye. He is not to content himſelf according to the common Cuſtom, with giving his Orders, and leaving all to the Care of idle Labourers, and negligent Servants. They are not to reap the Advantages, and they cannot be expected to take the Care. But he is inexcuſable who is to have all the Profit; and who will not overlook the Work, and ſee if it be done in the moſt beneficial Manner.

From the little Care that is taken about the hedging Work, it appears to me very plainly, that the Profits which may ariſe from it are not known: I ſhall therefore ſpeak what my own Experience has ſhewn me on that Head, in order to ſtir up the Huſbandman's Spirit.

This is certain, that it is the Landlord's Intereſt to plant or to promote the planting of Fences in this Kind, becauſe, as obſerved before, the Rents of his Eſtate are ſure to be encreaſed by it: and I ſhall ſhew that it is not leſs the Tenant's Intereſt than his. I know ſeveral who will grudge to ſerve their Landlord when it turns to no Account for themſelves, may be brought into it when they find it will anſwer their own Purpoſes alſo. And upon this Plan there will be no Oppreſſion in a Landlord's inſiſting upon a Covenant of Fencing, in the Leaſe, when the Tenant will himſelf reap the Advantage for his Time; as the Owner does in all theſe Caſes for ever.

If Hedges were of no other Uſe except as Fences, it would be the Farmer's Intereſt to keep them up carefully: for the better the Fence is, the greater is his Security of his Cattle and Crop. But in many Counties of England the Hedge yields a valuable Store of Fruit; and it might do ſo in all; for this being partial is owing to Cuſtom only, the ſame Advantage is allowed to all by Nature.

The Shelter alſo of his Hedges, which we have ſhewn to be ſo uſeful both to the Crop and Cattle, is ſurely the Tenant's Benefit: but the greateſt Inducement is behind, that is, the abſolute Profit; which, for want of Induſtry and Application, few know. In reality they rob themſelves of a great deal of Money, by their Careleſſneſs in this, as well as other Articles; for it is as much their Intereſt, in this View alone of the Wood they will yield, to raiſe, cure, and dreſs their Hedges, as to tend and to take Care of any other Part of their Stock.

Mr. Ellis, who is a Perſon of Veracity, affirms from his own Knowledge, that a Farmer in Hertfordshire, who occupied only ſixty Acres of Land in incloſed Fields, made in one Seaſon a thouſand Faggots from his Hedge-wood only, which

which he ſold for about twenty Shillings a Hundred. This I have great Reaſon to believe, for I have ſeen nearly as much Profit in other Places, where the Quick does not grow ſo freely, nor is ſo well underſtood in hedging as in Hertfordshire, which is, in that Reſpect, the Garden of England.

CHAP. XVII.

Of the Sloe, or black Thorn Hedge.

IT has been ſaid already, that although the Haw, or white Thorn, is the moſt general Shrub us'd in hedging, and the beſt for that Purpoſe in moſt Places, yet it is not univerſal, nor abſolutely ſuited to all. There are Soils in which it will not thrive; and beſide this, there are Circumſtances which may render ſome other Kind preferable, even in Places where that would grow ever ſo well. This is the Source of thoſe other Fences to be deſcribed in the preſent and ſucceeding Chapters.

The black Thorn is the next in Value to the white, in a Quick Hedge. And it is preferable to that and to all other Shrubs, for a dead Hedge, becauſe it is, of all Shrubs we have, the moſt thorny, durable, and naturally buſhy.

The Ground can never give a Reaſon for planting black Thorn, and not white, for they will both grow and thrive in the ſame Soils; and if any thing the black Thorn requires a better: but notwithſtanding this, we have already mentioned a very ſubſtantial Reaſon why the good Farmer ſhould plant it.

He will always ſucceed better in proportion as he conſiders every Circumſtance, and every poſſible Advantage. We have obſerved, that no dead Fence is ſo good as that made of black Thorn: for this Reaſon the Perſon who ſees that he ſhall have Occaſion for a good deal of dead Hedge, at any particular Time, or upon any particular Occaſion, will do well to plant at leaſt ſome Quickſets of black Thorn, if not all; and this, that the Cuttings, and ſuperfluous Stuff riſing from them may afford him a ſufficient Supply of that excellent Buſh, for the Purpoſes that have been already mentioned.

When the Farmer has this Reaſon for planting a Quickſet of black Thorn, let him conſider his Soil before he ſets about it. More is required than his having Occaſion for the Buſhes, he muſt know that the Ground will bear them.

In the firſt Place he is to be inform'd, that a very poor Soil will not do for this Shrub, and that in a very rich one it is apt to ſhoot too deep, and ſpread too far into the Ground, to the Hurt of other Things. I have ſeen more Hedges of live black Thorn miſs, than of any other Shrub whatſoever: this has been ſometimes owing to the Badneſs of the Ground, but oftener to the Unſkilfulneſs or Negligence of the Perſon employ'd to plant it: and I have, in other Places, where ſuch an Hedge has throve very well, ſeen all the other Growths ſtarved within a great Way of it, merely by the Quantity of Nouriſhment it exhauſted.

When the Huſbandman ſets out with this Foundation of Knowledge, concerning the Nature of the Shrub, he will be able to work on it to his Advantage. Therefore, when ſuch an Hedge is to be rais'd, let him chuſe a Part of his Land where the Soil is rich, but not deep. A two Foot Coat of Hazel Mould upon a Bed of Stone, or a Layer of Clay is beſt; if any ſuch offer upon the Land, the Farmer will be ſure to raiſe an excellent Fence, and to do himſelf no Harm in his other Products.

Let him, in this Caſe, prepare for planting his Hedge exactly as has been directed for the white Thorn; only let him dig the Ditch half a Foot deeper, that it may go a Foot and a half, or more, into the under Layer, to ſtop the direct Progreſs of the Roots into the Land. It is true, they will, on theſe Occaſions, ſink down below the Bottom of the Ditch, and riſe up again on the other Side, but not in ſuch Quantity.

I would adviſe the Huſbandman to prepare for his black Thorn Hedge exactly in the ſame Manner as for the other. Firſt of all, let him, ſome Years before hand, turn up a little Piece of Ground in ſome waſte Corner, ſow it with the Stones of Sloes, and fence it well in, weeding the Plants now and then, after they are come up, which will not be till the ſecond Year after ſowing; and letting them ſtand till they are of a Size for Sets.

When they are thus ready, the whole Practice is to be exactly the ſame as for the white Thorn Hedge. And there is this Advantage when they are carefully ſet, and the Defects ſupplied after the firſt Examination, that they grow much quicker than the white Thorn to a certain Standard; and being more prickly, and not ſo well taſted, they are not ſo liable to be crop'd by the Cattle as the white.

There is a conſiderable Advantage in raiſing the Sets in a little Nurſery of this Kind, they grow ſtraiter and better; and when they are removed to a richer Soil, which ſhould always be the Caſe, their firſt Shoots are much more vigorous. The Farmer will do well when he takes up the Sets for his Hedge, to leave ſeveral ſtanding at proper Diſtances in the Nurſery, becauſe, by this Means, he will have a Supply of the Buſhes for ſtoping up of Gaps, and other ſuch Uſes, for which they ſerve better than any other Kinds, before his Hedge affords them from the Cuttings.

CHAP. XVIII.

Of the Furze Hedge.

WE have mentioned, in the Sloe, a Kind of Hedge which will very well anſwer all the Purpoſes of a Fence, and which there may be particular Reaſons for planting, even in Places where the Huſbandman might, if he pleaſed, raiſe the common white or Hawthorn: we come here to ſpeak of a Shrub which is alſo very excellent for making a ſafe and durable Fence, which, at certain Seaſons of the Year, is alſo very beautiful; which always makes a pleaſing Variety among other Incloſures; and which has this greater Advantage, that it may be rais'd in Soils

and Situations where neither the white nor black Thorn will grow.

So much may be conjectur'd from what is ſeen in Nature. For we conſtantly in many Parts of ENGLAND, ſee the Furze Buſh growing wild in vaſt Abundance, upon ſandy, heathy, and barren Commons; where only here and there a black or white Thorn Shrub pops up its Head, and thoſe half ſtarv'd.

It has been obſerv'd already, that there are two Soils in which the white Thorn Hedge is not to be planted; theſe are very wet, or very dry and ſandy. What the Farmer is to ſubſtitute for it in the wet Places, will be named hereafter; the Furze is the proper Shrub for the dry and barren; for there is no Piece of Ground ſo barren on which Furze will not ſtand.

Where there is therefore a Piece of Land to be enclos'd, from ſome exceedingly barren Heath; or where the Place for a Fence is ſome old dry and mouldering Bank of almoſt entire Sand; or where the Ground is ſo entire a Gravel, that it ſcarce deſerves the Name of a Soil, there this Shrub is the Choice, and will ſucceed perfectly well. The worſt Objection to it is, that it does not laſt a great while: but then it is eaſy to be renewed, and it makes an excellent Fuel. Perhaps if we would copy the FRENCH, whom we are apt enough to imitate in Trifles, in their Management of Furze, planting of Hedges of it of thirty or forty Foot thick, in Places where the Ground is really not worth Culture, as in abſolute Sands, and entire Gravels, we ſhould reap an Advantage little imagin'd. To our good Fortune we have not ſo much Ground of this Sort as they, but where there is ſuch, it might better be uſed to this Purpoſe than to none; planting the FRENCH Furze, which grows five or ſix Yards high, and does not require any Care after the firſt Year or two.

They find theſe thick Hedges a prodigious and favourable Shelter for their Game; which is there the Property of the Farmer, as much as his Poultry; and they cut it up in the End for Fuel.

A dry barren Soil, and an expos'd Situation, is the Place for a Hedge of Furze. Where the Farmer has ſuch an Occaſion, let him not pretend to plant any other Shrub for that Purpoſe: nor in this is he to proceed in the ſame Manner as with the others.

Here is to be no Nurſery for raiſing the Sets, for there need be no tranſplanting. The Shrubs muſt be rais'd from Seed in the Places where they are to remain; and the Method is this.

In the Place where the Hedge is to ſtand, let the Ground be plow'd up deep in Winter, and let it lie in that Condition till the End of MARCH. At that Time let it be once again plow'd, and then harrow'd, to make it as even and fine as may be. When this is done, that is, in the very Beginning of APRIL, go carefully over the prepared Ground, ſowing it with well choſen and fine Seed, of that Kind called FRENCH Furze Seed.

When the Seed is in the Ground, let a dead Hedge be planted on each Side. It need not be a very ſtrong one, for it will be neceſſary only three, or at the utmoſt four Years. The Seeds will ſoon ſhoot, and the Plants when riſen to ſome little Height, are to be thin'd and weeded. They are to be kept weeded from this Time till they are become tolerably ſturdy, for then they will not ſuffer Weeds about them; and in three or four Years there will be a very ſtrong and beautiful Fence without any farther Trouble.

As the Furze Hedges require leſs cutting than the other Kinds, ſo they will very little bear it. It is ſeldom needful to cut ſuch a Hedge in Fields at all; and thoſe over-nice People who will do it, often deſtroy the Plantation. If the FRENCH Furze Seed be ſown, it rarely grows out much beyond the Bounds that were intended, for this Kind does not ſpread and run like the others: but if it happen under any particular Situation that it ſhould do ſo, the beſt Way is to cut it up cloſe to the Ground, and leave it to ſhoot again from the Roots.

In this Caſe it muſt be defended as at firſt, and it will ſoon ſpring up in greater Regularity. If the Circumſtances will not admit of thus cutting it up; and it be needful to reduce it to Bounds; this muſt be done by cutting: but as that is in itſelf ſo hazardous, great Care muſt be taken in the Manner of doing it. The principal Cautions are theſe.

If Furze be cut too cloſe into the old Wood, it will never ſhoot out again, ſo that when altogether needful to cut it, that muſt be done lightly. The Seaſon muſt be greatly regarded alſo, for nothing is ſo liable to Accidents from the Weather as freſh cut Furze. If cold follows, it certainly kills the Branch that has been wounded, and often the whole Shrub: therefore it muſt not be cut either too late in Autumn, or too early in Spring, for the Froſts may be deſtructive.

On the other hand, if the Furze be cut in extreamly dry Weather, the ſame Accidents follow as from Froſts, the dry Winds attacking the freſh Cut, part and deſtroy the whole.

For theſe Reaſons 'tis much beſt, as before obſerv'd, never to cut one of theſe Hedges at all; but if it muſt be done, the only Seaſon is the middle of APRIL, and then in perfectly moderate Weather.

Whether a Furze Hedge be new rais'd from Seed, or whether from the old Roots after cutting down, no Fence whatſoever requires ſo much Care in the guarding of it from Sheep, while it is firſt ſhooting. When young, they are extreamly fond of it, for the Buds are ſoft and juicy, but when it has got a little Strength and Firmneſs, its own innumerable Prickles are a full Defence.

One farther Advantage of a Fence of this Shrub, is not to be omitted; that is, it will grow not only on barren dry Sand, but on the barren and naked Sea Sand, as well as the Native Sea Plants. This points out a very great Uſe for it, which is in the making of Fences, where every Thing elſe refuſes to grow: theſe Places being generally ſuppoſed not capable of fencing by Hedges.

Scarce any Cattle will attempt to crop a Furze Hedge of ſome Growth, which has occaſion'd ſome to imagine, that it is unwholeſome, moſt Creatures having a natural Direction to

avoid all ſuch Herbs as are hurtful; but this is a common Error. There is nothing to cauſe this Shyneſs of Cattle to it, but the Pricklineſs of its Branches, for no Plant is more wholeſome. They ſow the French Furze in ſome of our Weſtern Counties, on Land that will bear nothing elſe; and among other Uſes, the green Tops are chop'd ſmall, and given to their Horſes. This chopping deſtroys the Pricklineſs, and the Creatures are then very fond of them, and very well nouriſh'd by them.

CHAP. XIX.

Of the Holly Hedge.

HOLLY is another of thoſe Shrubs which will grow in very indifferent Soils, where the white Thorn will either not grow at all, or but very indifferently. But this is not the only Reaſon there is to value it. Nothing makes a ſtronger or a better Fence. But it is ſlow in its Growth at firſt: every Thing has its Advantages and Diſadvantages.

I have ſeen old Holly Hedges in the Country make a very poor Appearance, and ſome grown quite out of Uſe; but ſo will Hawthorn, or any other, if neglected. The ſame Care that is required for others, is alſo wanted for theſe, and no other. If that be omitted, all the Hedges in the World will, after a certain Age, grow uſeleſs.

Holly loves a light and dry Soil: and it will live on the moſt barren. It has been ſaid already of Furze, that it will grow on a dry Sand, or entire Gravel, the ſame is true of Holly: but between the two there is this Difference, that the Furze is the beſt ſuited to ſandy, and the Holly to gravelly Grounds.

There is alſo another Kind of Soil, too common in many Parts of England, this is the ſtony. In this the Hawthorn is ſtarv'd, and the Roots even of the Furze are burnt up. The Holly will thrive and flouriſh upon this, and it is the only proper Shrub for a Fence on thoſe Grounds. It may be uſed on many others, but no other can be uſed on ſome of theſe. It loves Warmth and Dryneſs about the Roots, and will grow almoſt upon a Rock.

The Farmer ſees on what Soils he may, and on which he ought to uſe the Holly as a Fence. We ſhall now teach him the beſt Manner of raiſing, and preſerving it in this Condition.

Holly is one of thoſe Shrubs whoſe Seeds lie two Years in the Ground; but there is a Way of helping the Tedioufneſs of this. The beſt Method of raiſing the Sets is this.

Gather the Berries when they are full ripe, and begin to fall from the Tree, and laying them upon a large coarſe Cloth, rub them gently with another to break them, and wipe off the tough Juice from the Seeds. They need not be made curiouſly clean, but a great deal of this uſeleſs Matter may be taken off with little Trouble.

When the Seeds are thus clean'd, mix them with ſome dry Sand. Fill a large Garden Pot with this Mixture, and digging a Hole in the Ground bury it there. Let them lie thus from the Autumn when they were gather'd from the Tree, till the Beginning of the September following. Then take up the Pot; prepare a Bed of good light Earth, and ſow the Seeds in it, covering them ſlightly with a little of the ſame Mould ſifted over them. They will ſhoot the next Spring, and thrive, though it be ſlowly. They make very little Advance for the firſt three or four Years.

This is the Method of raiſing Holly; but there remains a Queſtion, Whether it be beſt to have a little Nurſery for this Purpoſe, or to ſow them where they are to ſtand? This muſt be determin'd by the Soil where the Hedge is to be rais'd, for on that depends the Rule for the Choice. If the Ground be very poor and ſtony, it is beſt to raiſe them from Seed upon the Spot: if it be ſomewhat better, the beſt Method is to raiſe them in a little Nurſery, ſuch as has been before named, and to remove them at a proper Time from thence, to the Place where they are to remain.

But even in ſowing them upon the Spot, ſome Cautions are neceſſary. If the Soil be of an exceeding barren ſtony Kind, the Seeds will be burnt up before they take Root. In this Caſe, let the Place mark'd out for the Hedge be plow'd up deep, to ſee if any good Mould can be rais'd from below. If not, the Farmer muſt be at the Expence of having a ſmall Quantity of good Mould carried thither, and ſtrew'd upon the Place, that there may be ſome Defence for the Seeds. After this, they are to be ſown, as directed already, and a good and durable Fence of a dead Hedge is to be made on each Side, for it will be a conſiderable Time before the Plants grow up to be a Fence themſelves.

When the Ground is ſomewhat better, and will give Nouriſhment to a tranſplanted Set, the beſt Way is to raiſe them in a Nurſery, and keep them there till they are of the Thickneſs of one's Thumb, they are then to be removed to the Place, and carefully laid in, chuſing a mild and moiſt Seaſon. And for ſome Time after, they are to be ſhaded and watered, if the Seaſon be dry and ſultry to require it. They will thus take Root firmly: and if ſome of them ſeem to die, they muſt be cut off cloſe to the Ground, and they will uſually recover.

In this Caſe they require a dead Hedge on each Side, as well as when rais'd from Seed, for they are even thus a conſiderable Time before they come to their Strength, and while they are young and tender, the Sheep are very fond of feeding on them: when they are grown ſtronger, they need no Defence, for the Prickly-neſs of their Leaves is ſufficient.

Some when they plant a Holly Hedge, intermix white Thorn where the Soil will bear it. They plant four Sets of white Thorn, and one of Holly, and as the Holly grows, they pull up the Quick or white Thorn. The Uſe of the white Thorn is to raiſe the Fence the ſpeedier. When the Shoots of this are all pulled up, if the Holly ſtand too thin, the Way is to lay down Layers from it where the Vacancies are, and thus it may be thickened at Pleaſure.

When a Holly Hedge is raiſed by ſowing, the young Shoots are to be thin'd, when they are two or three Inches high, leaving the ſtraiteſt, ſtouteſt, and heartieſt: and after this they muſt be kept carefully weeded, and at Times it will be proper to ſtir and dig the Earth between them and the Hedges. This never fails to make them ſhoot out ſtronger immediately.

In this Manner may the Holly Hedge be rais'd with Certainty and Succeſs. Its Fault is the Slowneſs of the Growth, and the Care that is requir'd to be taken of it while young. But this is all that can be objected to it; for in every other Reſpect it exceeds all other Fences.

No Hedge whatſoever is ſo beautiful; none ſo ſtrong. When well grown, it appears as a Wall rather than a Hedge, and is altogether impenetrable by Cattle: and in this excellent Condition it remains a great many Years. We have obſerv'd already, that the Uſe of Hedges is not only for a Fence, but a Shelter for the Crop and Cattle. No Hedge whatſoever anſwers this Purpoſe equally to the Holly. An Eye cannot pierce, nor can the Wind blow through it. All within is defended as a Piece of Garden Ground, whoſe Fence is walling.

The Wood of the Holly when it grows to a certain Age, is alſo very valuable. The Cabinet Makers and Inlayers purchaſe it at a conſiderable Price: and of the Bark is made Birdlime. Theſe, added to the Value of it in the immediate Article of fencing, make it ſurprizing, that in a Country where in general it will thrive ſo well, it is ſo little planted. I hope theſe Obſervations, which are truly the Reſult of Experience, and confirmed by repeated Practice, will make it more common.

Where Thickneſs and Strength are required in a Fence, nothing anſwers the Purpoſe equally to the Holly, and it will grow to any moderate Height. The only Trouble is at firſt: and that is more with the tranſplanted Sets, than with the Shoots raiſed from Seed. Theſe laſt require little more Regard than the black Thorn, or any other: and their only Inconvenience is, the Time of waiting for their growing to uſe. As to the Sets, if the Seaſon prove unfriendly, they muſt be treated like Garden Plants, and be ſhaded and watered till they take Root, but after that they are no more troubleſome.

It is odd, that Holly which is thus fitter than almoſt any Thing elſe for a Field Hedge, and is one of the unfitteſt that can be conceived for a Garden, ſhould yet be in a manner in England confined to the Garden, and neglected in the Field. But this is the Caſe; nor is there any Thing Cuſtom cannot do.

The very Thing which gives it its Preference in the Field, is the great Objection to it in a Garden. This is the Largeneſs of the Leaves. Theſe in the Field, fill and pleaſe the Eye, and thicken the Defence: they always appear beautiful here, becauſe they never are cut. In Gardens they muſt be cut; for there every Thing is to be kept in due Form; and the cutting of a Shrub with ſuch large Leaves as the Holly is improper, becauſe they look ſo ragged after it.

Fancy has taught People alſo to be very fond of the Variegations of the Holly; and great Pains are taken by buding and grafting to ſtreak and edge the Leaves with white and yellow; theſe are eſteem'd beautiful, but to a reaſonable Eye, they have only the Aſpect of Sicklineſs. They may be called pretty, but to him who has ſeen a free growing Holly in its own ſtrong and healthy green, with its Branches playing in wanton Luxuriance before the Wind, muſt think a ſtrip'd cut Holly, a very miſerable Improvement upon that beautiful Tree.

When the Holly Hedge is to be raiſed by Sets from the Nurſery, the greateſt Care imaginable muſt be taken, that the Seaſon is not dry or cold. The End of April, in the Midſt of warm Showers, is the beſt Time of all. But it may be very well done toward the latter End of Auguſt, provided the Weather be cloudy, cool, and now and then ſhowery. In theſe Seaſons the Sets ſhoot out good Roots at once, and they ſeldom fail afterwards.

CHAP. XX.

Of the Elder Hedge.

WE have treated of the four principal, and moſt known, as well as moſt uſeful Shrubs for Fences; and we come here to the mentioning of one which at firſt Sight may ſeem of a very trifling and improper Kind: but there are Reaſons for prefering on certain Occaſions, Things that are in their general Uſe inferior. This we have ſhewn already, under the Article of black Thorn; which, though inferior to the white, may frequently be planted in its Stead to Advantage. In the ſame Manner, though the Elder be inferior to all that have been named, there are Occaſions that may render it very proper; nay, more proper than any of them. It is fit the Farmer ſhould know theſe, and the Nature, Uſe, and Value of this weak Shrub: that he may proportion his Choice to the Neceſſities of the Occaſion, and to the Value of the natural Produce.

Elder then is neither ſo ſtrong in its Branches, nor ſo cloſe in its Growth as the white Thorn, black Thorn, Furze, or Holly; nor is it prickly as they are: all theſe Defects render it inferior to them all for a Hedge; for theſe are the great and general Requiſites and Perfections of an Hedge Shrub: but there are ſome Occaſions on which this Toughneſs of Branches, this Cloſeneſs, and Pricklineſs are not requiſite; and in theſe the Elder may ſerve.

We are to remember alſo, that all theſe Shrubs ſo well fitted for hedging as they are, have their Inconveniencies; and Holly, the beſt of them all, particularly in the Slowneſs of its Growth. This, though in a leſs Degree, is alſo chargeable upon them all: but the Elder is the quickeſt of any in its ſhooting; and it will bear planting ſo large, and takes Root ſo eaſily, that it may be called an immediate Fence.

To this let us add, that the Flowers and Berries bear a Price at Market; and that the Wood of the old Stumps is valuable, and of ſure Sale to the Turners: and we ſhall find that there

there is great Reaſon for naming the Elder among the Hedge Shrubs, for that it equals any of them in Value.

It has alſo another Benefit, that it is not ſo liable to be crop'd by Cattle, for they do not like the Taſte of its Leaves. Theſe are the particular Advantages of the Elder. It is true, that it is not proper for all Occaſions, nor will grow on all Soils: on the contrary, it will anſwer only particular Purpoſes, and will take Root only in tolerably good Ground: yet wherever it will, nothing anſwers better.

Elder makes an excellent Fence for Gardens, becauſe it is quick, ready, cheap, and affords ſo good Shade. In the ſame Manner where Fields are not liable to great Accidents; where the Banks are high and good, and the Cattle are uſed to be quiet in them, the ſame Shrub ſucceeds in the ſame Manner; for in the Conſideration of Shade and Shelter, ſcarce any Thing exceeds it.

When the Farmer has pitch'd upon a proper Place for a Hedge of this Kind, he needs not have the Trouble of raiſing the Plants from Seed, nor of laying them with that expenſive Toil and Regularity, as in the making up the Bank of Quick: the Elder will grow if any Piece of it be ſtuck into the Ground.

Let him cut a ſufficient Number of Elder Poles, eight or ten Foot in Length, and of the Thickneſs of a Child's Wriſt at the Bottom. Theſe he is to ſtick into the Earth of the Bank, not upright, but ſlanting; and when he has placed a Row at convenient Diſtances, ſlanting one Way, he is to ſet another Row in the Spaces between the firſt, ſlanting the other Way; by this croſs Direction, the Poles will form a Kind of chequer Work in Diamonds or Lozenges, and they may be ſecured, where neceſſary, by tying them at the Joints; and here and there faſtening them to a ſtrong Poſt.

No more than this is neceſſary, if the Soil be tolerably good: the Poles being thruſt ten Inches or a Foot deep into the Ground, will take Root; and almoſt immediately they will begin to ſhoot, and the Leaves by their Bigneſs and quick Growth, will preſently afford a perfect Shade and Shelter.

There is a great deal of Beauty to be obtain'd by the regular diſpoſing of theſe Poles. In the plain Way already mention'd, the Diamond Work is very pretty: but by cutting ſome in ſhorter Pieces, and a proper Care in diſpoſing and directing them in the Planting, they may be made into many of the Figures of thoſe Chinese Fences, which are ſo much admir'd in dead Work at this Time.

The beſt Seaſon for making an Elder Fence is in the Beginning of March: if the Weather prove dry, the Poles may be water'd half a dozen Times after they are ſtuck into the Ground, which will make them ſtrike Root ſo much the more readily. They will need no other Care but cutting to keep them within Bounds; for they are of ſo very free Growth, that unleſs this be done, they will ſoon exceed their intended Compaſs: nothing however cuts ſo eaſily; and no Shrub bears it better.

I have named the Advantages of an Elder Fence; 'tis fit therefore I name the Faults: for the Farmer, though he is to be told of Profits he may not be aware of, is not to be tempted into a Practice that has Inconveniencies, without being fairly told of them. When he ſees both Sides, he will be in a Condition to judge, which in any particular Circumſtance he is to take.

I have already mention'd the Weakneſs of the Elder, and its Want of Thorns and Prickles; for this Reaſon it is not to be truſted where Cattle can be tempted to break through, for it will not prevent them. As the Holly is the ſtrongeſt and moſt impenetrable of all Fences, this is the weakeſt and eaſieſt broke.

Another Objection to the Uſe of Elder for Fences is, that the Bottoms grow naked after a few Years, and nothing is ſeen but gaping Holes. The firſt is a material Objection; and the only Thing to be ſaid about it is, that the Elder is not fit in ſuch Caſes; but to this other, there is a ſhort Anſwer, and a very eaſy Remedy. As the Elder grows ſo readily, what can be ſo eaſy as to ſtop theſe Gaps by freſh Plants, as ſoon as they appear. Nothing more is neceſſary for this Purpoſe, than to cut off ſome ſtrait Sticks from the Trees where they can be ſpar'd, and plant them in the lower Part of the Bank, with their Tops juſt reaching to the naked Place. As the Planting of theſe Sticks is nothing more than thruſting them into the Ground, nothing can be ſo eaſy as this Practice, and nothing can be more certain, than that it will prove a ſucceſsful and certain Remedy.

Though the Flowers of the Elder, as well as the Berries, are uſeful in Medicine, yet they have ſo ſtrong and particular a Smell, that they are diſagreeable to many People; and are apt to give ſome Headachs. This is an Objection againſt the Elder, when there is any Thought of planting it very near a Houſe. But it is an Objection that reaches no farther. The very Wood, Leaves, and young Shoots of Elder, have all a diſagreeable Smell alſo, but this is not unwholeſome.

As the Berries of the common Kind of Elder are black when they are ripe; there are ſome Kinds which have them white, and others on which they continue always green, even when mellow; but theſe are trifling Variations, and little worth Regard. On the contrary, there is a Kind of Elder that differs from the others in the Leaves, and is worth the Planters Notice. I don't mean by this, thoſe idle and ſickly Variations of the Elder, with Leaves ſpotted with white, or ſtreaked with yellow, and kept in Gardens for their ſuppoſed Beauty: the Kind I mean here is, that Elder which has the Leaves finely cut into ſmall Diviſions. One meets with Trees of this here and there in moſt Counties of England: and I would adviſe the Farmer to plant a Parcel of theſe by way of Stock, whenever he ſhall find it convenient to have an Elder Fence; for this Kind of Elder has always more Branches than the common Sort, and when any Thing harden'd, they are ſtronger. The Leaves alſo are much more beautiful than the common Elder Leaves; and the Wood of this Kind is more ſolid than that of the other; and is prefer-

able to Box for many of the fine Works in which Elder is uſed by the Turners. People, while they are taken up with the Regard of a painted Leaf, do not attend to theſe real and uſeful Diſtinctions.

CHAP. XXI.

Of the Uſe of the Crab, Sallow, Bramble, and Alder in fencing.

WE have now gone through the Conſideration of the ſeveral Shrubs which are commonly uſed in Fencing, but there remain four others to be treated of, which, though ſeldom uſed alone for that Purpoſe, yet as they aſſiſt, or anſwer the ſame End on different Occaſions, ought to be named here.

As to the firſt of theſe the Crab, I have, in ſome few Places, ſeen entire Hedges of it; and they are very beautiful for the Regularity of their Growth. They give the Incloſure alſo the Look of a Garden when they are in Bloſſom; and have a pretty Effect when in Fruit. Neither are they without their Value, for the Wood is hard and ſerviceable; and from the Fruit is made Verjuice.

But with all theſe Advantages of Uſe and Beauty, I do not adviſe the making entire Hedges of it, for I have ſeen by Experience, that they are neither ſo good for Shelter or Fence. The Leaves of the Crab are indeed larger than thoſe of the white Thorn, but they are not nearly ſo numerous; and the ſame is to be obſerved of the Branches. Now the great Quantity of Branches and Leaves, is what gives the white Thorn the Preference above all other Shrubs for hedging.

When the Farmer ſhall chuſe whether it be from Faſhion or Whim, to have an entire Hedge of Crab, his Method is to be exactly the ſame as has been deſcribed for the white Thorn. Let him firſt ſet apart a Piece of poor Ground for a Nurſery. Let him there ſow the Seeds of the Crab, with the pulpy Part of the Fruit about them. And they will ſhoot quickly, and grow ſpeedily in good Shape.

When theſe Plants are of the Thickneſs of a Man's Thumb they are fit for Service: they muſt then be taken up, the Bank prepar'd, and the whole managed exactly as in the making a Quickſet Hedge of white Thorn. This is the Method to make an Hedge of Crabs alone, but it is what I would never adviſe the Farmer to do: the beſt Way of uſing this Shrub is, by mixing it with white Thorn in the Quickſet, when the Bank is made.

For this Purpoſe I would have the Farmer always, in his little Nurſery for his Hawthorn Sets, have ſome Crabs rais'd from the Seed, as already deſcrib'd. Let theſe be taken up, together with the white Thorn Sets, only in a ſmall Number; and laid in juſt as the Quickſets are. About one in every twelve, or fifteen Foot, will be very proper. They will thus grow up with the white Thorn; they will ſhew very beautifully in the Intermixture, when in Flower, and when in Fruit; and the ſame Uſe may be made of the Fruit for Verjuice; there will be a ſufficient Plenty of them for any moderate Uſe.

Some plant a Sallow among the Quickſet, at every fourteen Foot, in the Manner that the Crabs are here directed to be laid in: and in proper Soils this does well. It is of the Willow Kind, and therefore loves Moiſture, though it does not require ſo much as the common Willow. It is prudent therefore to plant this more plentifully in moiſt Meadow Fences, where, by its quick Growth, it is of conſiderable Advantages.

Brambles, or Blackberry Buſhes, are ſo far of the Nature of the Furze, that they will grow upon a very poor Soil: but it is not the Cuſtom to make Fences of them alone: nor are they fit for it, becauſe of the Length and Weakneſs of their Branches, which is ſuch that they cannot keep themſelves upright. They are of good Uſe planted on looſe Banks, to defend them from being over-run and trampled down by the Cattle. They alſo may be us'd to ſtop up Gaps in the Bottoms of Hedges, that with Age begin to grow bare in that Part. They may be rais'd with great Eaſe from the Seed; or Cuttings of them, will grow readily. The only Uſe they are fit for is, what has been juſt named, but that is not ſufficiently regarded: Nature very often ſupplies the Defects of Hedges with Brambles; and 'tis a Shame that Art does not imitate them in this as in many other eſſential Articles.

Laſt in this Diviſion of our Work, we come to name the Alder. This is a Water Shrub, and its Uſe in Fencing is of a very peculiar Kind. It defends the Sides of Meadows againſt being waſh'd away by ſwift running Waters. The Alder never grows ſo well as by the Sides of theſe Rivulets. The ſwift Streams of theſe frequently undermine their Banks, eſpecially at the Turnings: but the Roots of a good Alder are a ſure Defence.

There is ſcarce any Shrub whoſe Roots are ſo numerous or ſtout as thoſe of the Alder. And it is always ſending Suckers from the loweſt Roots; ſo that where there is ever ſo ſwift a Current, and ever ſo many Turnings follow one another, nothing more is needful to preſerve the Ground but to plant a ſufficient Number of Alders. In many Places alſo, where the Courſe of the River is ever ſo ſtrait, the Soil of the Meadow is ſo looſe and mellow, that it is continually waſhing in, and the Water is widening its Channel. Here the Alders are of the ſame Uſe: being planted along the ſtrait Bank, they preſerve it excellently.

CHAP. XXII.

Of the Bank Fence, with its Plantation.

IF our Intent were to recommend to the Farmer the Bank Fence alone, and naked, as it is uſed in ſome Places very commonly; we ſhould have inſerted the Rules for making it juſt after the ditching, leaving the Plantations of the Quicks to introduce that of Trees. But the Bank alone is a poor, raw, and ugly Fence, compared to the Bank with its Quick or Plantation: this is therefore its proper Place. The Manner of planting Quick has been ſhewn already: The Huſbandman has his little Nurſery of

Sets ready, and that not only of Quick or Hawthorn, but of the Crab, Sloe, and whatever other Shrub uſeful in fencing, is to be tranſplanted into its Place. We have now therefore only the making of the Bank to deſcribe; and the Manner of diſpoſing thoſe Sets which are ready rais'd, and of a fit Size.

The Bank is moſt proper, as an Incloſure, for Meadow and Paſture Grounds; and the Huſbandman ſhould firſt conſider the Nature of the Soil, before he attempts to raiſe it. Two Neceſſaries ſhould recommend it to him, the firſt, that it may be made cheap, the other, that it may flouriſh; and both theſe depend upon that ſingle Conſideration, the Soil.

An Earth that will cut eaſily and freely by the Spade, and is cover'd with a good thick freſh Turf, is the only one fit for this Purpoſe, nor let him ever have the leaſt Thought of raiſing it on any other. I ſpeak not of thoſe Banks of Clay or Dirt that are rais'd only by digging a Ditch, and piling up the Earth, and leaving it naked: but of the fine green Bank Fence which is uſed in ſome Counties, and deſerves to be uſed in all; which is beautiful and profitable; and remains firm, when once well made, for ever.

When the Huſbandman finds in his Meadow or Paſture Ground ſuch a Soil, ſo cover'd as juſt mentioned, let him ſet about the raiſing his Bank in the Beginning of the Spring, and at a Time when there have been moderate Rains. In very wet Seaſons the Earth of this Kind works untowardly, and in long dry Weather it is unfit; for it not only crumbles too much, but if the Bank be rais'd at ſuch a Seaſon, the Earth will ſwell and burſt, after the next Rains.

Having choſen then a proper Spot of Ground, and a fit Seaſon, the Work is to be executed in this Manner. In the Place where the Bank is to be rais'd, draw a couple of even Lines, at three Foot and an half Diſtance all the Way from one another. Then begin to dig up Turf in a Place cover'd with good ſtrong and freſh Graſs. Cut theſe Turfs a Span deep, of a long ſquare Form, and of ſuch Bigneſs as they may be moſt conveniently managed: as theſe are cut up let them be laid in two Rows, one along the Edge of each of the two Lines, with the graſſy Side outwards. They will lie thus in two Rows, with a Space between them.

A Foot diſtance from the outermoſt Row, not that which lies toward the Paſture, open a Ditch three Foot wide. Let it be dug ſloping, ſo that its Sides deſcend with a ſmall Slant, and carry it to ſuch a Depth as ſhall be neceſſary to ſupply a proper Quantity of Earth to make up the Bank, between the preſent and ſucceeding Rows of Turf.

The Earth which is dug up in this Ditch, is to be put in the vacant Space between the two Rows of Turf, juſt named, till it is brought to a Level with them. The Foundation of the Bank is thus laid, and it will be continued eaſily.

More Turf is now to be cut like the former, and a ſecond Row on each Side is to be laid on the former, very carefully; placing it even, but a little inwards; for the Bank is to be rais'd all the Way with a Slope, ſo as to be broadeſt at the Bottom, and ſomewhat narrower all the Way to the Top.

A ſecond double Row of Turf being thus laid, the Space left between them is to be fill'd up evenly with more Earth out of the Ditch: and the Surface well preſs'd down with the Spade; and left perfectly level, to receive the third Row of Turfs, and the Earth between.

No more Direction is needful for the raiſing of this Bank, than that the Work is to be continued in the ſame Manner, laying on more Rows of Turf on each Side, and filling up carefully the Space between with Earth; and continuing it ſlanting all the Way, till it is four Foot high, and at the Top its Breadth is two Foot and a half, one Foot being decreaſed in the Height.

The Space left between the two laſt, or top Rows of Turf, is not to be fill'd up ſo perfectly as that between the others; but the Top of the Bank is to be finiſh'd with a ſlight Hollow.

When the Bank is thus rais'd plant the Quickſets upon the Top. Let them be taken out of the Nurſery at a proper Size, and ſet a Foot deep on the Top of the Bank. They may be of any of the before-mentioned Kinds that bear tranſplanting, as Crab, white Thorn, or Sloe, but in general the white Thorn is beſt. It may be diverſified here and there with the Crab, or Sallow, but no Timber Trees, or large growing Fruit Trees are to be planted among it.

The Quick will flouriſh better in this than any other Plantation whatſoever. The Hollow at the Top of the Bank, which is ſtill to be preſerved in the Plantation, will detain the Rains, and ſend them down to the Roots of the Quick: and there is a fine Bank or Bed of Earth for them to grow in, which is thicker all the Way down, and has been juſt well ſtir'd and broken; ſo that it is in the fulleſt Perfection for ſupplying the young Growth with Nouriſhment.

When the Bank and its Plantation are thus finiſhed, a ſmall dead Hedge muſt be made on or near the Top, to keep the Sheep from runing up and nibbling the young Quick. Theſe Hedges need not be above fourteen Inches high, and no Matter how ſlight: for they will ſoon be needleſs; the Quick growing very faſt, and the Bank becoming every Day more and more firm, by the joining of the Graſs Roots from the ſeveral Turfs, ſo as to be in no Danget of Hurt from their Trampling, or indeed from any Accident whatſoever.

In the Autumn following let the Huſbandman go over the Hedge, Bank, and Quick, with his Eye, to repair what may be amiſs, it is very rarely that any Repair is wanted, but if there be the leaſt Damage it ſhould be ſupplied, for this is ſo beautiful a Fence that it is unpardonable not to keep it entire.

If there be any Defect in the Hedges, let them be ſupplied with ſome ſmall Buſhes of black Thorn: if any Turf in the Bank look decaying, or its Graſs become yellow, let it be ſupplied with a freſh one cut from the ſame Ground: and if any of the Quickſets have fail'd let them be replac'd with others, that all may be without Blemiſh.

It is proper to look over the Work, to ſee if any of theſe Accidents have happened: that if they have they may be ſupplied in Time, but it very

very rarely happens that any do. In general, if the Fence have been made according to theſe Directions, it continues without Fault, and improves every Day, both in Strength and Beauty.

The Rains that fall about this Seaſon of the Year, ſupply both the Turf and the Quick with Moiſture; and while the former ſhoots briſkly, the other continues in its Verdure. The freſh Roots of the Graſs which are continually puſhing every Way, join the ſeveral Turfs together in ſuch a Manner, that they quickly form one Body, not a Joint being any where ſeen: and in a little Time the Roots of the white Thorn, ſpreading through the whole Subſtance of the Bank, bind all firmly together into one tight and ſolid Body, that nothing can injure it. The Graſs continues to grow freely on the Slope of the Fence, and it is a Beauty: the crowning alſo of the Hawthorn, varied with the other Shrubs, which always look freſh and healthy, adds to the Grace of the whole, and makes it far exceed any other Fence whatſoever.

If the Ground be Paſture on both Sides the Fence; inſtead of a Ditch on the Outſide of the Bank, the Earth on each Side may be lower'd with a Slope of two Foot deep. This will anſwer the Purpoſe of the Ditch, in ſupplying a Quantity of Earth to fill up the Spaces between the Rows of Turf, in making the Bank; and will anſwer two other Purpoſes. In the firſt Place, the Bank from four Foot will be made, by this Lowering of the Ground at its Foot, a Fence of ſix Foot high, beſide the Hedge at the Top: and then no Ground will be loſt for the Paſturage, becauſe this hollowed Place will bear Graſs like the reſt; and ſo will the Sides of the Bank, which will, in good Seaſons, be as green as any Part of the Incloſure.

If the Circumſtances of the Place, or other Accidents, require the Fence to be higher, the Huſbandman muſt begin with a broader Foundation; and muſt cut away the Ground more at the Foot, or dig a deeper Ditch for a Supply of Earth: no more Difference is neceſſary, for the Method of carrying up the Bank is exactly the ſame: and the higher and larger the Bank, the better the Quick will grow.

No Hedge whatſoever affords ſo fine a Shelter to the Growth, or to the Cattle, as this Bank with its Plantation. It muſt be conſider'd indeed, that the Shrubs ſtand more expoſed to the Winds on it, than on any other Plantation; and for this Reaſon they ſhould not be left to grow too large. Some clip the Quick upon theſe Banks, which is a very good Method, for it at once thickens the Body, and keeps it in due Compaſs: and though, in general, the clipping of Trees be a very ridiculous Invention, it may be allowed, in this particular Caſe, with Uſe and Propriety.

CHAP. XXIII.

Of the Wall Fence, with its Plantation.

WITH reſpect to the Wall Fences of Fields, the ſame may be ſaid as has been already obſerved of the Banks, that although they are frequently uſed ſingly and naked; yet they never have half their Beauty, or half their Value, when they are ſo imperfectly made. Their Plantation giving them their greateſt Advantages and Superiority over the other Kinds.

In many Parts of ENGLAND Stone is ſo common, and lies ſo ready, that it is the common Material for Fences: Walls, in the Way they make them in ſuch Places, coming ſurprizingly cheap. We ſhall firſt ſpeak of the moſt common Fences of this Kind; and afterwards of the better Kind.

The moſt rude and vulgar Fence of Stone, is the Wall they build about their Lands in NORTHAMPTONSHIRE, and ſome other Counties, which, in the ſame Manner, yield that Sort of rough Stone us'd for this Purpoſe, near the Surface of the Earth; ſo that there is little Expence in digging, and in ſo many Places, that there is almoſt as little in carrying and laying it. In theſe Places they lay a Parcel of theſe rough Stones in the irregular flattiſh Shape in which they naturally riſe in digging, upon one another, without Mortar, till they have rais'd what they call a Wall. This is ſo looſe that in many Places you may ſee through it: and as where the Eye can pierce, the Wind very well may, theſe Walls are but a very indifferent Kind of Fence by way of Shelter; nor indeed do they deſerve a much better Character in any other Reſpect, for they are ſo ill put together that they are frequently tumbling to Pieces. 'Tis true they are eaſily repaired again; for nothing is requir'd but to lay up the Stones in their Places; but when the Walls are made, as ſome are that I have ſeen in that and the adjoining Counties, the Work is endleſs.

The ſecond Kind of Walls I ſhall mention, are ſuch as are found upon the Grounds of more careful Huſbandmen in the ſame Counties. Theſe are made of the ſame rough and irregular Stones as the former, pil'd up on one another in the ſame Way, without Mortar; but then they are laid ſo much more carefully, that the Wind does not blow through them in ſo many Places; and the top Stones are laid in Clay by way of Mortar. Their own better Diſpoſition in the Body, and this little ſtrengthening at the Top makes theſe much ſuperior to the former: they defend the Crop and the Cattle better, and they are not ſo continually tumbling down. The Difference of Labour in the building of theſe Walls is ſo trifling a Conſideration, in reſpect of their Superiority over the others, that I have been ſurprized in looking over the Fences of thoſe Counties, to ſee ſo many of the former, and ſo few of theſe. The one tumbling down every where, and the others tolerably firm.

A farther Improvement of theſe rough Walls I have ſeen in ſome few Places, which was by throwing in a Quantity of rough loamy Earth among the Stones, as they laid them in the Wall. This was a rough Imitation of laying the Stones in Mortar; and adds but a little to the Expence, while it encreaſes vaſtly the Goodneſs of the Fence. A Wall of this Kind, with the great Spaces filled up with Loam, and the Top tolerably laid in Clay, will ſtand a vaſt while, and anſwer the great Purpoſes of a Fence bet-

ter than either of the former, by many Degrees.

It may be natural enough to ſuppoſe, at firſt Sight, that the Wind blowing through the Holes in theſe rude Walls, would be no more Hurt to the Cattle that ſhelter under them, than that which comes through the Buſhes in a common Fence: but Experience ſhews it is much more miſchievous, and the Occaſion of it is plain enough in Reaſon. The Wind that blows through Buſhes comes broken and in a weak Manner; but that which iſſues in at a Hole in a Wall comes with a Draught and Current.

In the more northern Counties of England, where there is Plenty of a more regular flat Stone, they build their Fences of this Kind better in Proportion: in ſome Places, where the Stone naturally riſes in large flat and tolerably even Pieces, a Wall built of theſe without Mortar, and only top'd with ſome very ſmooth ones, laid in Clay or clayey Loam, ſtands a great while, and muſt be confeſs'd a good Fence for all the Purpoſes of Incloſure, Defence, and Shelter.

A much better Fence may, however, be made in any of theſe Places, even where the Stone is worſt of all, upon the Principle of the Bank Fence, deſcribed in the foregoing Chapter. This is what I ſhall recommend to the Huſbandman, where he has the proper Materials.

To this Purpoſe let him chuſe the eveneſt and moſt regular Stones he can conveniently meet with, for in thoſe Places they are often as ready at hand as ſuch as are worſe. The Preference is not ſo great in the making this Fence, as in the raiſing a ſingle Wall; but the evener the Stones the better, and it is worth while to be at ſome Care in every Circumſtance, about a Fence that is to be at once ſo beautiful and ſo laſting: for in both Reſpects this exceeds moſt others.

When he has provided himſelf with Stone, let him dig up the Ground a little Depth for a Foundation, and open a Pit, or Ditch, in ſome Place near, whence he can have a Supply of Earth as he ſhall want it, in carrying up the Wall. When thus prepared let him ſet to work.

He is to make, as it were, two Walls in one, laying the Stones one upon another, firſt two and then one between.

As the Wall is carried up, the Space between is to be fill'd up with the Earth dug out of the Foundation, or from the Ditch or Pit open'd for that Purpoſe. This brings all the Work into one Maſs, and adds Strength and Firmneſs.

The Stone Work is to be continued in this Manner, and fill'd up with the Earth to ſuch Heighth and Breadth as is neceſſary, according to the Circumſtances of the Place; and from Time to Time the Stones are to be beat in flat at the Sides, which gives the Work great Strength, as well as Regularity of Appearance.

When the Wall is thus carry'd to a proper Height, let there be Quickſets of any Kind planted upon it, in the ſame Manner as has been directed about the Bank Fence. Theſe will grow and flouriſh excellently, and there is ſomething in the Aſpect of a Wall thus crown'd with a thriving Hedge of Shrubs that is particularly pleaſing.

This is the fineſt, beſt, and moſt laſting of all the Stone Fences; nor is it a mere Propoſal from Fancy. Theſe Kinds of Walls are not uncommon in many Parts of the Weſt of England, and they there plant not only common Hedge Shrubs, but Aſh, Elm, and other Timber Trees upon them. To this indeed I object, becauſe the Force of the Winds upon ſuch Trees, when they are of any conſiderable Growth, is too much to be truſted, where the two Walls are to ſtand the Streſs of it: I have ſeen a very well made Fence of this Kind torn to Pieces for eighteen Foot length, by the blowing down of a middling Aſh that ſtood upon it: when the Trees are larger, the Danger is greater in proportion: nor is it either needful or proper to run the Hazard.

What I would adviſe is, to plant the Top of the Wall with white Thorn Sets, taken at a proper Age from the Nurſery; and for Variety, to add a Crab every twelve or fourteen Foot; for both the Flowers and the Fruit of that Shrub give a pretty Variety.

The Crab I have all along recommended to be intermixed in the Plantations of white Thorn Hedges; and its Beauty, which is ſome Recommendation, is not the only Advantage. Where that Shrub is left to itſelf, there is that Benefit of its pleaſing the Eye, but in whatſoever Fence it is uſed, it may be train'd up to anſwer other and better Purpoſes.

No Stock whatſoever is equal to the Crab for the grafting of Apples; and in Places where Cuſtom has eſtabliſhed the Property of theſe Fruits in Hedges, this ſhould be always the Uſe made of the Crab Shrub; for where People have been us'd to ſtrip Fruit Trees in Hedge Rows, they will not only take the Fruit, but break and tear down a great Part of the Hedge to get it.

In ſuch Places therefore the Crab is to be left to itſelf, and the Huſbandman muſt be content with pleaſing his Eye with its Bloſſoms, and with gathering its Fruit for Verjuice. In other Counties, where Fruit ſtands quietly in the Hedges, he is to order his Crab Trees in the following Manner.

Let him prune them up every Seaſon, till they are above the Reach of Cattle, and then let him engraft them with the moſt uſeful and valuable Kinds of Apples. The Way of doing this in the eaſieſt and ſureſt Manner, will be ſhewn hereafter, in its proper Place, when we come to treat of the Orchard: it is only named here as a Part of the Care of an Hedge.

Nor ſhould I omit to mention the Practice of a Gentleman in Devonshire, who on one of thoſe double Wall Fences, that had Earth between rais'd Apples inſtead of Crabs, at certain Diſtances between the white Thorn: it was a Matter of Curioſity more than Uſe; for the beſt Method for thoſe who intend to have Apples in their Hedges, is to raiſe Crab Stocks, and

and graft them: but as it ſucceeded to his Wiſhes, I ſhall mention the Method.

Inſtead of Crab Seeds he ſowed the Kernels of ſome good Kinds of Apples in his Nurſery; and when he planted Quickſet upon any of his Walls, he placed one of theſe young Apple Trees at every twenty Foot. He took out an Apple Set of at leaſt three Years Growth more than the white Thorn Sets were, ſo that it had the Advantage of them in that Reſpect; and he planted theſe with a particular Care, and pruned them up with his own Hand, ſo as to give them all poſſible Advantages. The Conſequences of this was, that he was always able to ſhew Apples that the moſt experienced Cyderman did not know how to name. The Shoots from Seeds in all Vegetables, are thoſe that yield the Varieties; and by raiſing all theſe from Seed, and by the Benefit alſo of the peculiar Situation in which they were planted on theſe Wall Fences, he never fail'd to have here and there what they allowed to be a new Kind. Some of theſe he brought afterwards into his Orchard with Succeſs. This however was little more than Curioſity: for as to Uſe the Graft Kinds always bear ſooner; and in that Practice a Man is ſure of his Kind, whereas in this other Method all is Hazard.

End of the Third Book.

A

COMPLEAT BODY

OF

HUSBANDRY.

BOOK IV.

Of Coppice Wood, and Timber Trees. In THREE PARTS.

I. *Of* COPPICE *and other* SMALL WOOD.

CHAP.

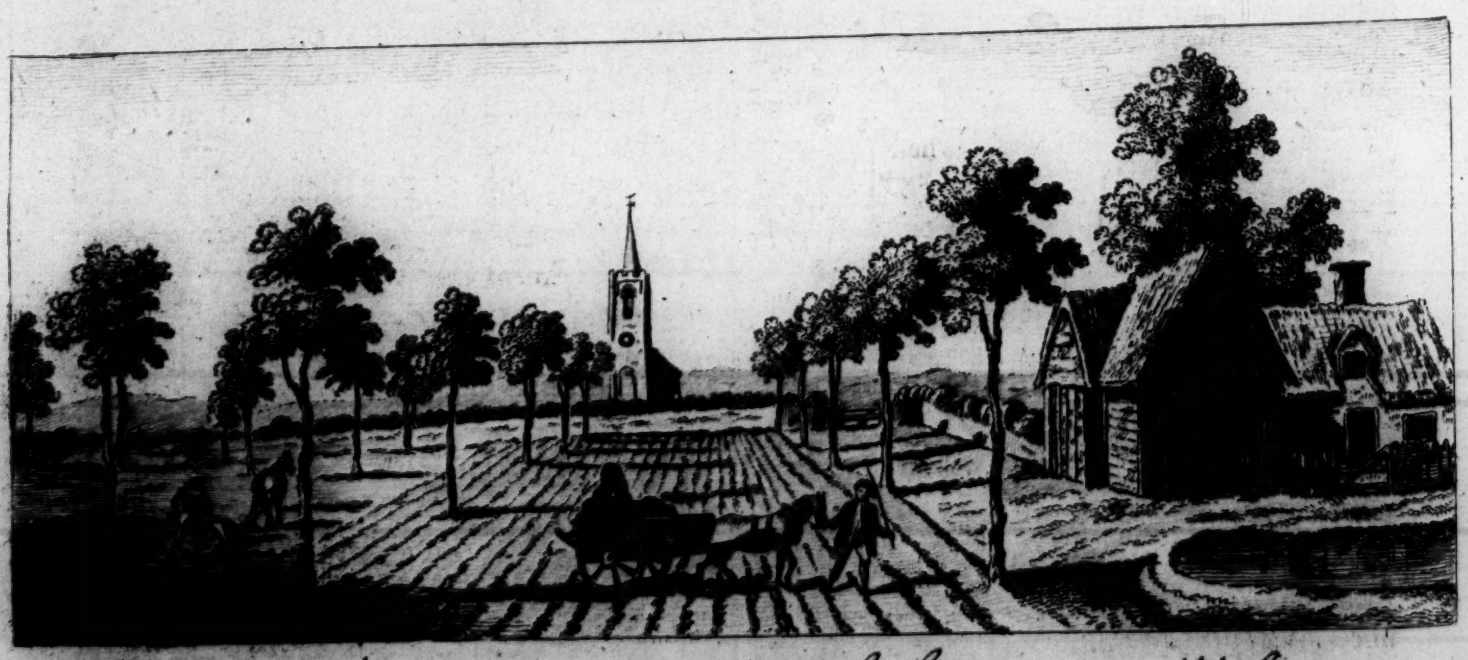
II. *Of the Management of* TIMBER TREES.

III. *Of the ſeveral Kinds of* TIMBER TREES.

The

The Wall Fence planted. The Bank Fence planted.

Coppice Wood rais'd irregularly. Coppice Wood regularly planted.



Timber Trees rais'd in Rows, with the Ground till'd between.

Engravd for The Compleat Body of Husbandry; Printing by the King's Authority in Weekly Numbers, at 6d. each.

The INTRODUCTION.

Of the Improvements made by Planting.

THE planting of Hedges, and of the Fruit and Timber Trees occaſionally interſperſed among the Shrubs compoſing them, leads us naturally to the raiſing and planting of Trees, and Shrubs in general. Our Buſineſs throughout this Work is to inform the Huſbandman how he may increaſe his Profits, and improve the Farm which yields them: and in nothing can that be aſſiſted, more than by judicious and orderly Plantations of Trees.

This will be the Subject of our preſent Fourth Book, and we ſhall begin with the raiſing, managing, and felling of Coppice, or, as it is commonly ſpoken, Copſe Wood, becauſe that is neareſt of kin to the Hedge Shrubs laſt treated of; and thence going from leſſer to greater, we ſhall advance to the Culture of Timber Trees.

There is no Step the Huſbandman can take in Planting, provided it be done with Diſcretion, that will not add to his yearly Income; or that will not be an enriching of the Land: and there is this farther Conſideration, that all he does in this Way gives alſo Pleaſure. It encreaſes the Beauty, as well as Value of the Ground; and his Eye ſhares the Advantage with his Pocket.

It is the peculiar Happineſs of theſe Plantations that all Soils will bear them. There are Lands too wet and too dry for Tillage: for there are ſome ſuch as it is impoſſible to improve. Theſe are the few really barren Lands of ENGLAND, yet on theſe Trees of one Kind or other will grow. They are to be ſuited properly to the Soil, and the Expoſure; and this done, they yearly increaſe in Value, and afford a Shelter and Defence to the Grounds, that before wanted it: thus extending their Influence beyond what riſes ſimply from their own Value.

In many Parts of NORFOLK, there are Valleys naturally rich and fertile, but lying at the Foot of ſandy Hills, they are overwhelmed with that barren Material by every Wind, and violent Shower. Of late they have in ſome Places begun to ſow upon the Sides of theſe Hills, FRENCH Furze. This grows ſo well, that once in three Years it is cut for Fuel, and ſells at a good Price; and all the Time it fixes the Surface, and preſerves the Meadows below. What pity that a Practice ſo doubly beneficial, ſhould not be univerſally follow'd.

As there are Shrubs appropriated to the drieſt Sand, ſo are there alſo to the moſt wet Side of a River. Theſe will be deſcrib'd in the ſucceeding Chapters; and it will be ſhewn, that no Piece of Ground whatſoever need be left unus'd, ſince ſome Tree or Shrub will grow on it; and the very meaneſt of them will yield very conſiderable Profit.

The Benefit of Plantations, whether of Shrubs or Trees, is not confin'd to this preſent or immediate Advantage: they improve the Land on which they grow; and the Planting a Copſe upon an unfruitful Piece of Ground, is an excellent Method of improving the Soil. This I have had Opportunity of ſeeing in my own Neighbourhood, where one of the barreneſt Spots in the Pariſh after yielding a great Profit from the Coppice Wood rais'd upon it, became a very good and fertile Field upon the ſtubbing up the Roots; and continues ſo to this Day.

Where Land is ſo indifferently fitted by Nature for Corn or Graſs, that it requires a great deal of Expence in manuring to produce a tolerable Crop, it is often better to plant it with Coppice Wood, for the annual Profits will be much greater, and the Expence in a manner nothing. There are alſo Pieces of Ground ſituated ſo unfortunately, that they are too remote from the Farm, or from the Sources of the Manure, and Tillage; theſe cannot be dreſs'd for Corn, but at a great Expence, becauſe of the Carriage of the Materials: here therefore is another Reaſon for planting; and the Succeſs is certain; and the Profits greater than any will believe who have not Experience.

The Land Owner is greatly concern'd in this. In how many Parts of this Kingdom are there Lands, that cannot be let for more than Five Shillings an Acre, and that from their Soil, Situation, or ſome other Accident, will not yield the Farmer any Profits at a larger Rent. How much muſt it be to the Advantage of the Owner in this Caſe, to plant them with Coppice Wood. At twelve Years Growth the Wood may very well be worth twenty Pound the Acre; and at a ſecond felling but ſeven Years afterwards as much; for the Roots being more eſtabliſh'd ſhoot faſter.

There is greater Security of the Profits alſo in this, than in the common Articles of Huſbandry, for Crops will fail ſometimes, and Stock will die. Here Nature does the whole Buſineſs, and is above the Reach of Accidents: nor is there any Difficulty in making, after a proper Growth, the Profits annual, and as regular as by any other Courſe. Suppoſe a Coppice of thirty Acres be planted and divided into ten Parts, one of theſe may be felled every Year: and by this Management every Year will yield three Acres of ten Years Growth.

A little Management in theſe Things is all. The Huſbandman who ſets out without it, will be perplexed with the leaſt Difficulties, and overturn'd in his Deſigns by the ſlighteſt Diſappointments: he who ſets out properly will overcome the greateſt.

The Huſbandman who ſhall ſee the Profits of this Practice, is not to ſuppoſe that becauſe barren Lands will bear Coppice Wood, only barren Lands are fit for it; nor is he to grudge the putting ſuch as are better, nay, even the beſt to this Service; or ſuppoſe the Price of the Rent will be a Drawback over-proportion'd to the Advantage: the Truth lies in juſt the contrary, for though bad Land will bear Wood; good Land will produce it much better, and the Growth will be quicker; ſo that the Benefit will be many Times over greater than the Coſt.

The better Land is that is planted, the larger will be the Profit. I have read with Surprize, of a Plantation upon a tolerably good Land, that at eleven Years Growth afforded Wood to the Amount of ſixty Pounds an Acre: but I

have now ſeen it verified. A Piece of good Ground planted with flouriſhing Sets, will yield at eleven Years, Pole Wood, and Spar Wood, and ſome Quantity of ſmall Building Timber.

The raiſing of Coppice Wood and Timber Trees in Woods, is not the only Advantage to be made by planting. There is ſcarce any Place where ſome Tree or other may not be ſet, and there is none that does not bring its certain Advantage. Trees planted in odd waſte Places, Trees of Avenues, and thoſe in the Hedge Rows, ſet as before advis'd with the Quick, all yield a certain and a regular Profit. Every Man is a Gainer who ſets them.

The Time taken up in the Growth of Wood, is one great Objection, it requiring forty, fifty, or more Years to bring many of the Timber Trees to a Condition for felling to Advantage; but though ſlow, it is certain. Who would grudge to ſet a Plant that coſts him in a manner nothing, and that without requiring any Care or Trouble, will in fifty Years be worth four, five, or ſix Pounds. Who would grudge the Trouble of planting a Thouſand ſuch, which ſhould at the End of that Time be worth a little Fortune. What an eaſy Way of adding five or ſix Thouſand Pounds to an Eſtate: and where it is of any tolerable Extent, what is the Difficulty of adding inſtead of five or ſix, fifty or ſixty Thouſand Pounds this Way.

Indeed nobody grudges this Trouble, but all neglect it. Men do not look into theſe Things till a certain Period of Life; and then they are not to expect to live till the Time of reaping the Advantage. Perhaps not: but why ſhould they deny this Benefit to their Heirs! is there any Way ſo eaſy of raiſing Fortunes for younger Children. It is ſo eaſy and ſo certain of Succeſs, that 'tis a Crime to neglect it: and the Nation as well as Families ſuffer by the Fault.

But to thoſe who are ſo ſelfiſh, that they will not ſpeak a Word, or give an Order for their Heirs, the Plantation of Coppice Woods may be recommended as warmly as any other Practice whatſoever; becauſe they may reaſonably enough, at almoſt any Period of Life, expect Time to reap its Benefits: and theſe, although not ſo great as thoſe from Timber Trees, are enough to tempt the coldeſt Imagination, that is once inform'd what they truly are.

As to the Plantations for longer Growths, every Day gives us Inſtances of their Value. Things intended only for Ornaments to Eſtates, becoming in this Courſe of Time great Additions to them. How common is it to ſee the Trees of a long Avenue, which were planted only to pleaſe the Eye, of ſuch a Value, as warms the next Heir's Heart when he thinks of them. Others might as well have been planted, ſays he, in waſte Places, as theſe for Ornament; and he is ready to curſe his Parent who did not do it. Let him take Care to do for his Son, what would have been ſo acceptable to himſelf.

Between theſe Timber Trees and the Coppice Wood, may be mention'd another Kind, thoſe that are ſet for ſhrowding. The Aſh, and many other Kinds, ſerve very profitably for this Uſe, as ſhall be ſhewn at large hereafter. In general the Trees that are of quickeſt Growth are fitteſt for this Purpoſe; and for the reſt, they muſt be ſuited to the Soil, the Willow and Poplar for moiſt Places, and ſo the others as they naturally require.

Theſe are to be planted by Ditch Sides, in Hedge Rows, and on waſte Grounds: and they are to be ſhrowded according to their ſeveral Kinds, at ſix or eight Years Growth. After this they conſtantly bear a good Head, and the Shrowds increaſe for every following cutting. In the mean Time they are ſecure from Injuries of all Kinds, and need no Fences.

As the Shrowds are principally uſed for Fire Wood, the Profit ariſing from theſe Trees is greateſt where that is ſcarceſt; but there is no Place where it is not enough to make it very deſireable.

I have hinted before, that beſide the immediate and proper Value of Trees in Woods, Coppices, Hedges, or ſingle; they add to the Value of the Land about them, and this is ſeen every Day, and confirm'd by univerſal and continual Experience. Indeed there is no Wonder it ſhould be thus; for we ſee Hedges of vaſt Uſe by their Shade and Shelter. Woods, when they ſtand on the Edge of ſome Piece of Land, that would otherwiſe be expoſed to deſtructive Winds, muſt be of greater; becauſe being thicker, they are a more certain Defence. The ſingle Trees, and thoſe in Hedge Rows, afford Shelter for Cattle againſt the Winters Storms, and the Summers Heats; in either Plantation they afford the Huſbandman Timber for his neceſſary Occaſions; for the Repair of his Buildings, and his Implements, and for his Chimney. The Maſt bearing Trees yield Food for Swine; and, in fine, there is not one, the meaneſt of any Kind, that has not its ſecondary Uſes.

Finally, The Neceſſity of Wood where there are Iron Mines, and thoſe of other Metals, is ſufficiently known. Nothing is ſo eaſily rais'd as Wood, and no Soil but will bear it, why then will not thoſe who are ſo deeply intereſted in its Growth, raiſe it in ſuch Places.

BOOK IV. PART I.

Of Coppice, and other Small Wood.

CHAP. I.

Of raiſing a Coppice from Seed.

WE have in general propoſed the Diviſion of Plantations according to their Kinds, into Coppice Wood and Timber Trees, and are to treat of them ſeparately, becauſe they require in many Reſpects a diſtinct and different Management. We are to enter firſt on the Conſideration of the ſmaller, and after to advance to the larger Kind; our firſt Buſineſs therefore is to deliver Rules for the raiſing the Coppice Wood.

This may be done two Ways, by ſowing or by planting. We ſhall lay before the practical Huſbandman, theſe ſeveral Methods, with their Advantages and Diſadvantages; and direct him in his Choice, from the Reſult of Experience in both Kinds. In the preſent Chapter, we ſhall acquaint him with the Methods of raiſing the Coppice from Seed: in the next, by planting.

It has been obſerv'd already, that any Piece of Land, even the moſt barren, will bear Trees; and the Farmer will do well to plant on all ſuch Places; but he is not confin'd to them. He may take in a Piece of barren Ground; or he may uſe for this Purpoſe ſuch as has been tilled already; he need not grudge a tolerable Soil, nor think much of the Rent he pays, for if that be no more than its Worth, the Wood which is produced will not let him be a Loſer.

When he has fix'd upon his Ground, if it be to be taken from the Common, the firſt Thing he is to do is to encloſe it with a good Fence; for nothing is ſo liable to Accidents as a young Plantation, nor is there any Produce among which Cattle will do ſo much Harm.

If it be a Field that is incloſed already, he muſt thoroughly repair the Fences, that they may every Way keep out all Kinds of Cattle. This Expence of Incloſure may appear at firſt Sight a Diſadvantage; and the Preference may be given to the Plantation of Trees, for Shrowding or Pollards, which yield a great deal of ſmall Wood, and need no Incloſure, nor take up any Ground; but an Anſwer is given to this at once, by thoſe who have experienced both, which is, that the quick Growth of the Coppice Wood makes ample Amends for the Expence.

When the Ground intended for the Coppice is fenced in, let it be prepared by two or three deep and good Plowings, to refreſh and break the Mould thoroughly: or it will be very well worth while, where the Quantity is not too great, to dig it well up with a Spade. In this laſt Method the Way is to trench it throughout two Spit deep, and caſt the upper Part of the Soil undermoſt.

This will prepare and break the Earth excellently: and it has been found by Experience, that in Ground thus prepared, the Trees ſhoot in a Manner greatly ſuperior to all that can be ſeen in any other Way of preparing the Earth for them.

Which ever of theſe Methods is taken, the Soil muſt be made very fine: if it be plow'd, it muſt be extreamly well harrow'd afterwards; if dug with the Spade, let the Rake come after, and the whole be laid as fine as the Beds in a Garden.

Where the Soil is tougher, it will require more working, and where more tender and mellow, leſs will do; ſo that there is no laying down particular Rules on this Head to ſuit every Occaſion. All that can properly be ſaid on the Matter is, that whatever be the Soil, it muſt be brought by frequent turning and breaking, to the Condition I have mention'd. If it be kindly, leſs Labour ſerves: if otherwiſe, more muſt be employ'd: but never let the Huſbandman ſlight over this Part of his Work, for all his future Succeſs will depend upon this thorough Preparation of the Ground.

If he have his Choice among different Kinds of Soil, he ſhould fix upon a good loamy Ground preferably to all others; and he ſhould chuſe that which is deep; for, though Trees ſhoot faſt and freely in a ſhallower Soil, they do not thrive upon it afterwards. However, ſuch is better for Coppice Wood than for Timber Trees, becauſe as they are for a longer and larger Growth, their Roots muſt pierce deeper.

The Reader who has conſider'd what has been written here already upon the Subject of Soils, will eaſily comprehend the Reaſon why a loamy one is here prefer'd to any other for the Growth of Trees in general. It is of a mix'd Nature between the ſandy and clayey, and therefore will agree with ſuch Trees as are ſuited to either of thoſe Kinds. None gives Paſſage to the Roots more freely; and yet, it has a Body that preſerves and faſtens them ſo, as to ſupport the Trees.

The Huſbandman being thus inform'd of the Nature, Dreſſing, and Fencing of the Soil for his Coppice; is now to conſider of the ſeveral Kinds of Seeds, and the Manner of ſowing them.

His Coppice is not to be entirely deſtitute of the Timber Kind, it being very proper to have ſome for Standards, but it is in general to conſiſt of ſuch as are of ſmaller Growth. Among theſe the principal, and thoſe of which Coppices are generally compoſed, are the Hazel, the wych Elm, the Birch, the flowering Aſh, the common Aſh, the Elder, the Hornbeam, the Maple, the Service, the Crab, the Cheſnut,

the Cherry, the white Thorn, and black Thorn, the Willow, and the Sallow.

Some of theſe delight in wet Soils, as the Willows and Alder, and others in dry or in middling Ground; this will be explain'd more at large hereafter, in treating of the ſeveral Kinds diſtinctly; but it is neceſſary to name it generally here, that the Planter may have it in his Mind, and direct himſelf accordingly.

If his Ground be in general wet, let him raiſe ſuch Kind of Coppice Trees on it as flouriſh beſt in the wet: if it be dry, let him conduct himſelf in the ſame Manner, ſelecting for it ſuch as love thoſe Situations: and if it be in part wet, and part dry, let him ſuit the Growth in the ſame Manner to each part, ſetting in thoſe Places which are wet, the Kinds that love Moiſture, and the others in thoſe which are dry. He is in every poſſible Reſpect to promote the free Growth of the Plantation, and nothing will do this more effectually, than a due ſuiting the Kind to the Soil.

When he has thus conſider'd his Ground, and determin'd what Kinds to raiſe upon the whole, or what particular ones upon the particular Parts of it; he muſt next ſeek for the Seed; and in this he is to be as careful as in any of the other Reſpects: or all his former Labour and Care will be thrown away. Let not any be frighted at the great Strictneſs and Conſideration of every Article in the preparing for raiſing of Copſe that is enjoin'd here. There is no great Difficulty in performing every Part in this nice and accurate Manner, and the Succeſs of the Plantation will always be proportion'd to it. In general where we ſee ſome thrive excellently, and others miſcarry, 'tis owing more to the Care that has been taken in the Preparation of the Ground, and Choice of the Kinds, and of the Seeds of each, than to any natural Excellence or Defect in the Place where they are rais'd.

To be ſure of the Goodneſs of the Seed, I would have the Huſbandman never buy it, but always ſave it himſelf. There may be a Thouſand Faults in bought Seed, which he will prevent in that he gathers; for his own Uſe becauſe he knows how much depends upon that Article.

As we have recommended no ſtrange or ſcarce Sorts of Trees for the Coppice, he may find enough of the ſeveral Kinds in his Neighbourhood, and may gather the Seeds himſelf.

In this let him take Care always to take them from a good, healthy, and flouriſhing Tree. Let him ſuffer the Seed to hang on this till it be thoroughly ripe, and then gather it by ſhaking the Boughs, and no other Way. And when he has thus got together a larger Quantity than he ſhall want, let him look it carefully over, and pick out of it for his Uſe only ſuch as is clean, ſound, firm, weighty and bright.

When the Seeds are thus pick'd, let them be put into large Garden Pots, with ſome Sand, and ſet by in a tolerably dry Place for the Winter. They might be ſown in Autumn as Nature ſcatters them, but then they would be in Danger of being eaten into by Inſects, or devour'd by Field Mice, and other Vermin. Nature intends the feeding theſe Creatures with the Seeds of Trees, as well as the raiſing a Supply of each Kind; and it is therefore they fall naturally at that Seaſon: but the Huſbandman in this Inſtance has nothing in view but the raiſing that Supply, therefore he will do well to avoid the Danger of their being eaten.

All is now got ready for the Sowing: the Seeds have been preſerv'd during the Winter, and the Ground ſo well work'd, that it is ready to receive them. The Spring is come, and the Huſbandman muſt get to his Work. Let him take out his Seed, and ſpread it carefully.

I would adviſe him by all Means to do this with his own Hand, going over the Ground with a judicious Eye, and ſcattering the Seed equally, and ſparingly. After this let it be well cover'd, and then Nature is to be left to herſelf.

There is a great deal of Difference in the Time of ſhooting of the ſeveral Kinds. Some ſhewing themſelves quickly, others not till after ſeveral Months, and ſome not till the Spring following. This has been obſerv'd already, and will be treated alſo more particularly hereafter, under the diſtinct Heads, where we ſhall mention the ſeveral Species.

When the earlieſt ſhooting Kinds have begun to ſhew themſelves, if there be any Quantity of Weeds riſing among them, let them be carefully rooted up, and if the Seaſon prove very dry after the deſtroying the Weeds, give the whole Ground, if it can conveniently be done, a little Water. The Earth having been diſturb'd by rooting up the Weeds, will receive this the more readily, and it is ſurprizing to ſee the Effect it takes on the young Plant.

After this the Huſbandman is to wait Natures Courſe for the Shooting of the ſeveral later Kinds, keeping his Fences in perfect Repair, and have an Eye frequently on the Plantation, to keep off all Miſchief, for nothing is ſo eaſily hurt as a Tree in its firſt Shoot.

When Winter comes on, let him order ſome black Thorn Buſhes to be ſpread lightly, and carefully, over the young Plantation; and upon theſe ſcatter a little Straw where the Ground is moſt expos'd to the Winds. This will break the Force of thoſe nipping Blaſts, which are ſo fatal to young Roots of Trees, and preſerve them from all other Miſchief.

The Summer following let the Plantation be kept clear of Weeds; and as the Winter comes on let there be a few black Thorn Buſhes ſcatter'd over the Ground, but more lightly than at firſt, to defend the young Shoots of thoſe Seeds which have not appear'd till the preceeding Spring, that they may be in like Manner defended their firſt Winter.

The Summer ſucceeding this, let the Huſbandman carefully go over the whole Ground, after a thorough weeding, and let him draw ſome of the Shoots where they have riſen too thick, and plant them in Places where they have riſen thinner. This is his Time for thinning and regulating his Plantation; and after this having once more look'd carefully to his Fences, he may leave all to the Courſe of Nature: not doubting but that he will have a Growth of Coppice Wood in every Reſpect as much ex-

ceeding that of his Neighbours, as the Care he has taken in theſe ſeveral Articles has been more.

I am ſenſible that in the whole Courſe of ordering this Coppice Ground, I have given the Huſbandman Directions to employ a great deal more Trouble than is generally allow'd to this Article of his Buſineſs; but I am alſo ſure from Experience, that he will be well paid for every Part of it, in the ſpeedy Growth, and Quantity of the Wood.

Some have a Way of raiſing a Coppice from Seed, by ſowing the Seeds of their ſeveral Kinds of Shrubs with their Corn, upon a Piece of Land they intend to lay up for this Purpoſe. I have read Books in which this is recommended greatly; and I have ſeen it try'd, but the Event has not anſwer'd to the Promiſes. The young Shoots have always ſuffer'd greatly by being trod upon in the getting in the Harveſt, and though the Stubble being left ſtanding, affords ſome Shelter for them the following Winter, it is but very poor in Compariſon of that regular Method I have here propoſed.

There can be no Objection rais'd againſt this Method, of which I have ſpoken ſo largely, but it's Expence: and this, if it were great, would be anſwer'd by the Increaſe; but in Reality it is not. The Care requir'd of the Maſter of the Plantation, is greater than the Charge; for his own Eye muſt be over all. As to the reſt, a little Money will go a great Way; and what ſeems much in the directing, is little in the working.

CHAP. II.

Of raiſing a Coppice by planting Sets.

WE have ſhewn in the preceeding Chapter, a Method of raiſing a Coppice with Certainty and Succeſs from Seed; in this we are to propoſe as candidly the other Way of doing it by Sets; and it will become us to be as impartial in the Account of the Advantages either Way as poſſible.

But to prevent an Error at the ſetting out, it will be proper to name one natural Objection againſt the Way of doing it from Seed, which is the Loſs of Time. The Sets, or young Trees, coſting little, and being advanced ſome Years Growth when put into the Ground. This is rather a natural Objection than a judicious one; for, though it hold true of ſome Trees and Shrubs, it does not of others. There are ſome that will take at once, and ſhoot ſtrongly upon the Removal; others will be ſo much the more ſlow for it, that it has been of a ſeedling Tree, and one tranſplanted, that the former has in a few Years overtaken the latter, though it was of ſeven or eight Years Growth; and has continued growing ſtronger for many Years after, though the Soil, Situation, and Expoſure, were the ſame to both, and all other Advantages equal. Mr. WORLIDGE, an Author of great Veracity, aſſerts from his own Knowledge, that a Walnut ſet into the Ground, ſhall overtake a Tree of ten Years Growth planted at the ſame Inſtant.

One Thing more is to be obſerv'd againſt the Way by planting, which is, that as it will be prudent to have ſome Timber Trees in a Coppice, theſe will do much beſt from Seed, becauſe the Shoot is always ſtraiter, and grows evener, and more regular, when ſown in the Place, than when brought in by tranſplanting: and this in Timber Trees is a vaſt Article, their Value being, when grown, in a great Meaſure proportion to it.

Upon the whole it is to be allow'd alſo on the other Hand, that Shrubs, and the leſſer Trees, bear tranſplanting better than thoſe which grow to a greater Height: and one everlaſting Rule muſt be, that the Huſbandman either raiſe them himſelf upon a poor Piece of Ground; or take Care it be a poor Piece, from whence he takes them if bought. This being the Caſe, they will, upon being removed into his own better Land, ſhoot more freely; whereas if his own Soil be poor, and that of the Nurſery have been better, they will make but a very ſlow, and bad Progreſs, as has been named already, on other the like Occaſions.

After theſe general Obſervations, we ſhall come to the Method of raiſing the Coppice by Plantation; in which the Huſbandman is firſt to go through all the Care of raiſing the Shrubs in a Nurſery, or elſe to be at the Expence of purchaſing them; and the greater Hazard of their thriving. There are many Reaſons why he ſhould raiſe them himſelf; we ſhall therefore ſuppoſe he intends that, and begin from the firſt Article.

He muſt firſt then ſelect a Piece of Ground for a Nurſery; and in this he muſt be very careful; for on his proper Choice of this, depends a great Part of his Succeſs in all that follows. He is in his Choice to have regard to its Soil, and its Situation and Expoſure.

In Soil it muſt be very poor, for the Reaſons given already, that the Shoots may flouriſh when removed to the other Ground. There is ſcarce any Ground in which the Seeds of the ſeveral Trees and Shrubs will not ſhoot; and all that is requir'd of this Place is, that it be ſuch as will give them Power to make the firſt Shoot, and ſupport it to a little Heighth. I ſay a little, becauſe I am for the Farmer's taking up his Sets earlier than is uſually done; being certain that the younger they are tranſplanted, the better they will thrive; and that the Time thus loſt in other Uſes on the Land, will be well repaid by their expeditious Growth. This Loſs of Time, and Uſe of the Land, is the great Reaſon of the Preference given by many to planting, inſtead of ſowing the Ground for a Coppice. But Experience has ſhewn us, that any Loſs ſo ſuſtain'd, is repaid manyfold.

In Situation, this Spot deſign'd for a Nurſery, muſt be defended from the North and Weſt, and open to the South Eaſt. It muſt be well fenced; for one Breach may deſtroy the Labour of ſeveral Years, and it will be beſt if it lie dry. This is an Advantage of the ſame Kind with that which is drawn from the Poorneſs of the Land; for the Trees tranſplanted from a dry

to a moſt Soil will always ſucceed; whereas, if removed from a moiſt to a dry they are very apt to miſcarry.

Such a Piece of Ground being choſen and fenced; let it be well turn'd up by the Plow or Spade, in the Beginning of Winter. Let it be turn'd again early in the Spring, and perfectly clear'd from Weeds; and then let the Seeds be ſown in it These having been gather'd, examin'd, and pick'd by the Farmer's own Hand, in the Manner before deſcribed, for ſowing the Coppice.

The beſt Manner of ſowing is this. Let all the Seeds be kept ſeparate; and let the Ground thus prepared be cut up with Trenches or Furrows four Inches deep, drawn at two Foot diſtance quite along or acroſs it, and in theſe Furrows let the Seeds be ſown, ſcattering them lightly in; and ſowing only one Kind in one Furrow. When they are in let the Ground be drawn over them with a Rake, and then the whole left to Nature, only taking Care to keep the Place clear from Weeds.

There are two Sorts of Weeds in particular that are to be guarded againſt in a Nurſery, theſe are the common Dock, and the common Couch Graſs. The Dock roots itſelf ſo deeply that it cannot be torn up afterwards, without diſturbing ſome of the young Shoots; and the Couch Graſs ſpreads ſo by running under the Ground, that it will entangle itſelf with the young Roots, and rob them of their Nouriſhment; and will be impoſſible to be rooted up without tearing them up with it.

This Method of ſowing by ſprinkling the Seeds in a Trench, or Furrow, is beſt for thoſe Shrubs which have ſmall Seeds; but for ſuch as are larger, as it will often be proper to have ſome of theſe, the beſt Method is to ſet them with more Exactneſs and Regularity. Thus Acorns and Cheſnuts, for the raiſing their ſeveral Trees, are beſt ſet in Rows by themſelves by a Line. But with reſpect to the Oak in particular, I ſhould always be for planting the Acorn in the Ground where it is to ſtand, for the Reaſons before-mentioned, the regular Growth of that Tree being a great Article in its Value.

The Nurſery being thus ſown is to be watch'd juſt in the ſame Manner as the young Coppice, when rais'd from Seed; and particular Care muſt, in either Caſe, be taken, to keep out Hares and Rabbits; for they will get in where there is not a Breach for Cattle, and they will eat up a whole Plantation to the Ground, when it is very young; and from their gnawing it never well recovers; and when the Shoots are of a larger Growth they will, in hard Winters, eat off their Bark, which is as deſtructive. The Care therefore of this Article extends to the Coppice, as well as the Nurſery. The particular Methods of warding againſt this Miſchief will be laid down hereafter, in its proper Place; where all the Accidents to which Trees are liable, will be treated of together.

The Seeds of the Nurſery having thus ſhot, and the Shoots having been thus preſerved in their tender State, from Weather and other Accidents; when they are grown to an Age to remove for the planting of the Copſe, let the Ground laid out for it be opened in good, deep, and wide Trenches, at twelve Foot diſtance. Let this be done in the latter End of Autumn; and let the young Sets be carefully removed out of the Nurſery, and, with all Exactneſs and Regularity, ſet in theſe Trenches.

In the Nurſery the Seeds of the ſame Kind of Shrub were always ſown in the ſame Furrow, but in the tranſplanting them let the different Kinds follow one another in the ſame Row, at moderate Diſtances. Thus the Coppice will be planted in the ſame Variety with that which is rais'd from Seed, and the Trees will not only look but thrive the better.

There is this Advantage in planting the young Trees in Rows ſo diſtant from one another, that the Huſbandman may make uſe of the Ground between the Rows for any other Growth, till the Trees are of ſome Height; and this tilling between, far from hurting the young Trees, will aſſiſt their Growth. Then the Coppice will grow afterwards with a beautiful Regularity, being all laid out into natural Walks and Alleys. I ſhould not name this as an Article worthy the Huſbandman's Conſideration, if it had in any thing interfered with his Profits; but it here agrees with them in every Article, for theſe vacant Walks will, in the felling Time, give the Workmen room to cut and finiſh up their Work well; and they will alſo give good and free Room for the Carts to come for the carrying off the Produce: and at the ſame Time Experience ſhews, that the Quantity of Wood produced in the ſame Number of Years, will be greater in a Coppice that has been planted in theſe diſtant Rows, than in one where the Trees have been ſet in the uſual thick and confuſed Manner.

CHAP. III.

Of the managing and ordering a Coppice in its Growth.

I Have laid before the practical Huſbandman the two Methods of raiſing his Coppice, at once from the Seed, or by the Aſſiſtance of a Nurſery, that he may take his Choice, according to his own Pleaſure, to the Uſes he can make of his Ground while the Shoots are raiſing in the Nurſery, or to other Circumſtances, for theſe may preſcribe a different Conduct on different Occaſions.

I ſhall not preſume to lay down any general and abſolute Rule in this Caſe. All I ſhall ſay is, that what I have ſeen by Experience in the Country where I live, would lead me to prefer the Method by Seed, where all other Circumſtances were indifferent either Way; but I would not advance upon this limited Knowledge, that the ſame Practice is to be prefer'd every where.

We have ſuppos'd the Coppice now rais'd by one or other of theſe Methods; and the Trees beginning to acquire ſome Strength. The Planters Care, though it be leſſen'd at this Time, does not abſolutely end there; he is to ſee that his Coppice be duly ſupplied with young Trees and Shrubs in all Parts; not too full in one Place and vacant in another.

To this End he is to go over it the Year after all was left ſettled, whether by the Seedlings or tranſplanted Shoots, and in general this will be the Difference, that in a Coppice rais'd by ſowing his Buſineſs will be to thin the Ground; and in that rais'd by planting to thicken it in ſome Places.

In this as well as the firſt thinning of the Coppice rais'd by ſowing, I would have the Planter keep in his Mind the Advantages ariſing from the planting the Shoots in the other Way in thoſe diſtant Rows, as has been directed under that Head. This is a Method which gives a conſiderable Advantage to a planted Coppice over the ſown; but it is an Advantage that may in a great Meaſure, though not perfectly, be given to the ſown Coppice in the Manner of thinning.

In the ſown Coppice Preference muſt be given in the taking up ſuperfluous Shoots, to the ſtrongeſt and beſt growing; but ſo far as may be let the thinning be ſo conducted as to leave the ſtanding Shoots in diſtant Rows. Theſe will never be ſo regular as when the Coppice is planted in Trenches dug by a Line, but the nearer it approaches to that the better.

It muſt be own'd alſo, that in Coppices rais'd by ſowing, not only the ſeveral firſt Years Uſe of the Ground is loſt, but alſo the Advantage of tilling and employing the Earth between the Rows afterwards, which tilling, as before obſerved, is ſerviceable alſo to the Trees; but where I have ſeen the Experiments made, the Method by Seed, as I have ſaid already, in ſpite of all this had the Advantage.

Upon the fulleſt Conſideration of all theſe Particulars which I have now, in their due Courſe, laid before the Huſbandman, perhaps it will appear in general, that when rich and valuable Land is to be laid up for Wood, the Method by planting is to be prefer'd; and when poor Ground of ſmall Price or Value is to be employed for this Purpoſe, then the beſt Method is by ſowing. But in this, as in the former Inſtances, the Rule is not to be delivered as univerſal, but the Owner, or Farmer, is to weigh all the Circumſtances together, and then determine. They have been all laid here ſo particularly before him, that he may have them in his Eye together, and ſet out in this profitable Article of his Profeſſion, in the moſt advantageous Manner.

We have directed him in the going over his riſing Coppice for the laſt Time, if it have been rais'd by ſowing, to thin it, by taking up ſuch Shoots as ſhall be found ill-faſhion'd, or ſuperfluous, in ſuch a Manner as added to the firſt thinning, ſhall diſpoſe the Shrubs, though rais'd at Random from ſcattered Seed, into the Appearance of ſomething like Order and Regularity.

On the other hand, when he makes this Viſit to his Coppice rais'd by planting, he will find it is thickening that it wants; and this is as eaſily done as the other. The Shoots were planted here in ſuch Number only as it was fit they ſhould ſtand; and though this has been done ever ſo well, ſome will have fail'd: the Places of theſe muſt be ſupplied; and whereas ſome others will be found to grow very irregularly and ill, it will be beſt to take them up and put others in their Stead.

This is the laſt Time of going over the Plantation with this View, ſo that if any of them are found to grow ill afterwards, the beſt Way is to cut them off ſlanting near the Ground, and leave them to make a new Shoot; which, the Root having now great Heart, will be very ſtrong.

But in this Article of thickening a Coppice for the laſt Time, in order to its full Growth, we are not to omit that there are other Methods, and thoſe very eaſy and familiar, beſide that of taking up a bad Shoot, and planting a freſh one in its Stead; or ſetting ſuch in accidental Vacancies.

In the firſt Place, there are ſeveral Kinds of Trees and Shrubs that will grow very well from Stakes or Cuttings; and theſe will ſucceed no where ſo well as in a Coppice of ſome Years Growth, becauſe they are ſhaded, and the Ground is kept damp about them as if watered.

The Trees which are to be planted thus by Sets, are more numerous than commonly imagin'd, the Willow, Sallow, Oſier, Alder, Aſpen, and black and white Poplar and Elder, may all be thus rais'd, and the Time for planting the Sets is early in Spring. Theſe are of excellent Service for the thickening the Coppice, in Parts where the Ground is damp. This Wetneſs which has cauſed the other Plantation to fail, will make theſe thrive, for they are the proper Trees for it, and will never fail. It will be uſeful to go over the Coppice, whether rais'd by ſowing or planting, in this Manner in Spring, when it is of a due Growth; and thus to add to it, in the proper Places, theſe Kinds which love a watery Soil, and which will not only thicken it as to Number, but advance beyond all others in thoſe Parts of the Ground.

As Spring is the Time of adding theſe Trees, in this particular and eaſy Manner to the Coppice, the Seaſon for ſupplying its Deficiencies with the others, if introduced from the Nurſery, is in October or November; they are to be choſen of a proper Growth; and to be taken up juſt after the Leaves are fallen. In the removing theſe, as they are ſomewhat larger than thoſe firſt planted, ſome more Care is to be taken. They are to be rais'd up with as much of their own Earth about them as can be preſerved, and only the tap Root, or large downright Root, is to be ſhorten'd: a large Hole is to be open'd for their Reception; and the Roots are to be carefully and evenly ſpread in it, and cover'd with light Mould. The whole being fill'd up, the Plant is to be watered, and ſo left to grow.

As this Method of tranſplanting into the Coppice is much more troubleſome than that of raiſing the Willows, and other Trees juſt mentioned, by Sets; there is another middle Practice between them, which may be us'd very advantageouſly for the thickening of a Coppice: and this is by what is call'd among Gardiners, laying of the Branches.

To this Purpoſe, when the Huſbandman ſees a vacant Place that wants to be thickened, let him pitch upon a good Branch of one of the neareſt Trees on each Side; and giving each a Chop half through, or more, as has been before obſerved on the plaſhing of Hedges, let him

bring it down to the Ground; and opening the Earth a little, lay in the Branch, ſtaking it down with two or three Pegs, and then cover it with the Mould that was thrown out.

Each of theſe Branches, thus laid, will produce a great Number of Suckers, which will grow freely enough; and the vacant Place will thus become, perhaps, one of the thickeſt Spots of the whole Coppice, in leſs Time than could be imagin'd.

The laſt Time for laying of theſe Branches is in the Beginning of the Spring, juſt when the Sap is riſing freely, and the Buds are going to break out on the Twigs. If the Earth thrown out of the Trench, that was made for laying it, do not cover it thoroughly, there ſhould be more added till a little Hill be rais'd all along. Where the Branch is carried: this will forward the ſtriking of Roots downwards, and Shoots upwards; and the Quantity and quick Growth of the young Plants, will ſurprize thoſe not uſed to theſe Aſſiſtances of Nature.

If the Coppice be too thin in many Places, where the Branches from the neighbouring Trees cannot be laid to thicken it; let ſeveral Branches of ſome other proper Kinds be laid in their Place, in the Manner juſt directed for a Supply of young Trees, if the Nurſery do not afford a competent Number for that Purpoſe. Theſe will ſend up each its proper Quantity of Shoots, and they may afterwards be removed to Places where they are wanted with little Trouble.

Many Trees are propagated better this Way than any other, in particular the Lime, the Birch, and Horſe Cheſnut; and the Elm very well. Theſe young Sets are to be removed early in Spring, and once water'd, and they will grow without any farther Trouble.

The Sets of Willow, Poplar, and the like Kinds, which we have order'd to be inſerted early in Spring in their proper Places in the Coppice, are to be cut only one Way, at the End that goes into the Ground. Experience ſhews that they take the more certainly for this little Circumſtance.

Finally, to give the laſt Article in the Management of young Coppices, we are to mention the cutting them down at a certain Growth: not for their Wood, but to increaſe the Quantity afterwards.

Some deliver this as a neceſſary and univerſal Practice; and in ſome Places it is univerſally done: but this we do not recommend, though, in part, ſuch a Practice be very uſeful.

It is founded on this, that from the main Shoot when cut off, there will riſe a Number of others: this is a plain Truth; but Experience does not therefore always ſupport the Practice. When this is done, it is to be at two Years Growth, if the Coppice have been rais'd by planting, and at four Years if it have been rais'd from Seed. The Shoots are to be cut off within three Inches of the Ground, and there will riſe from them many new Shoots, which the Root will puſh up very vigorouſly, and which will ſoon make ſo many good Poles.

There may be Places where it will be neceſſary, or at leaſt proper, to cut down the whole Growth at that Time in this Manner. Particularly when the Soil is very poor, and the Coppice having advanced ſo far, is ſeen not to proſper. In this Caſe the cutting down the whole within two or three Inches of the Ground, will give Strength to the Roots, and they will ſhoot up vigorouſly from all the Stems: but although particular Circumſtances, and eſpecially bad ones, may ſometimes render this proper, it is not to be ſet down therefore as univerſally neceſſary.

Some Time is plainly loſt by it; and in Places where the Growth ſucceeds well, 'tis evidently better to let it wholly alone than to cut it up. 'Tis better in this Caſe to take an earlier felling, as for Inſtance, at eleven Years Growth; and then to expect the Growth of theſe numerous Shoots, which will riſe ſo quick from the Roots now ſo confirmed and ſtrengthened, that in ſeven or eight Years, there will be another felling ready, richer than the firſt.

But to ſpeak from Experience, and to favour real Advantage more than any particular Scheme, it will be beſt to moderate the Practice; and I would have every Huſbandman in part follow it, whatſoever be the Soil and Condition of the Growth, tho' very rarely do it entirely.

Thus at the third Year, if the Coppice have been raiſed by planting; or in the fifth, if from Seed; I would have him go through it for the laſt Time with a careful Eye, making good all Deficiencies, and retrenching all Superfluities: and I would have him now take a Labourer with him, with a good ſharp Bill in his Hand. Let him examine every young Tree in the Coppice, and let him leave all ſuch as grow proſperouſly and regularly to ſtand as they are, but let him ſee every one that grows irregularly and ill, or that ſeems not to thrive like the reſt, cut down in this Manner within three Inches of the Ground, by one ſlanting Stroke of the Bill. This Practice will give Strength to ſuch Roots as want it, by taking off for the preſent the Shoot that was too much for them to feed; and it will leave the reſt to continue in that proſperous Condition wherein he finds them. This is the Practice of Reaſon; and this the Method in which the moderate and judicious Huſbandman will uſe all thoſe Inſtructions which are given by People too warm in the Purſuits of their particular Notions, to give Way to a due Conſideration of their Intereſt.

CHAP. IV.

Of the Felling of Coppices.

WE have now brought the Coppice to a Time and Condition, in which it wants no farther Aſſiſtance from the Huſbandman; he is only to ſee that the Fences keep ſound in every Part, and leave all to Nature. The Trees are now too ſtrong to be hurt by Weeds; on the contrary, they will ſuffer none to live among them; except ſome few of a particular Kind, as Fern about their Roots, and Sanicle, Betony, and ſome other ſuch under their Shade, which do no Harm, and will not live elſewhere. The

Husbandman is to give himself no more Trouble on this Head, but wait with Patience till the Coppice is fit for felling.

We meet with very punctual Directions on this Head in Books; and every Woodman to whom the Husbandman shall speak on the Subject, will dictate to him as positively: but Experience is more cautious; and following that Guide alone, we shall tell him that no exact Direction can be given. The Writer delivers imperfectly, what he has heard partially; and the Woodman forms his Judgment upon what he has seen in two or three particular Places, and thinks all Nature is to follow that Rule.

Experience shews, that in different Places the Growth of a Coppice is very different, according to the Soil, Situation, Degree of Moisture in the Ground; and many other Accidents: some very obvious, others not to be discern'd by the most curious and penetrating Eye. The Time of felling the Coppice is to be regulated according to this: for 'tis not its being of such an Age from the Sowing or Plantation, but its being in such a Condition of Growth that renders it fit to cut.

All that can be deliver'd with Certainty on this Head is, that the earliest Time at which a Coppice should be cut, in whatever Manner it has been rais'd, is the eleventh Year. It is only in favourable Soils and Situations, that it is fit to be felled so soon; and in others, from this Time the Husbandman must Year by Year watch its Growth, to see when it is in a Condition for cutting down to his Advantage.

Twelve or fifteen Years is a common Age for felling; and sometimes there is a Necessity of letting the Wood stand longer. But this is to be understood only of the first fall: for the Roots are then so establish'd, that a much smaller Time does for a new Growth.

It is a very good Practice in many Circumstances, to fell the Coppice in Parcels, as has been hinted already. For Instance, Let the Owner begin at twelve Years Growth, and fell one eighth Part of his Coppice: the next Year let him fell another eighth Part, and so on every Year one eighth, to the last. The last Years felling will then be of twenty Years Growth; and he will find it will very well pay for the Length of its standing.

Every succeeding Year's felling will be larger and larger than the last; and the Difference between the Growth of twenty Years, and that of twelve, greater than will easily be imagin'd.

This is the Way of making the Coppice yield a regular annual Income; for by that Time he has felled the last eighth Part; the first having had so many Years for Growth, is ready to be felled again, and he may thus go on Year by Year, so long as the Roots will hold out.

The Time for felling a Coppice is during the whole Winter; the Woodman may be set to work in the third Week of September, and the Business may be continued till the first Week in March. After this, the sooner the Produce is got off the Ground, the better: for the Owner is to consider his succeeding Growth. Spring will be now coming on, and the Trees will be very ready, and quick in shooting from the Stumps. These Shoots must not be injur'd, for on their fair Growth depends the Value of the next Fall. For this Reason the sooner all is clear'd off the better; for the Feet of the Cattle, and Wheels of the Carriages, and the Roughness of the Brush Wood will tread down, break and destroy these young Shoots to a great Degree, if this Part of the Work be neglected, until they have made their Appearance, and obtain'd some Length.

Let the Husbandman himself attend the Woodmen in their Work, that he may see the felling perform'd to his Advantage. In the first Place let him leave a Number of regular and well growing Trees at proper Distances for Timber; and let him see these rightly trim'd of their waste Boughs, that their Sap may be so directed as to feed the Trunk, and carry it up even and regular.

Let the others be cut off at five Inches from the Ground, that the Shoots for the next Growth may rise properly; and let them be cut off slopeing, and with a sharp Instrument; for all boggling at the Stump does great Mischief. The Success of the succeeding Growths in a Coppice, depends more than can be imagin'd on the employing a good Workman, and seeing that he keeps his Tools in order.

A Readiness and Expedition in the removing the Wood of the last cutting, has been recommended already: when all is clear'd off, the Husbandman is to see the Coppice well fenced as at first, that it may shoot without Interruption or Injury. He cannot be too careful on this Head; for the Mischief he may suffer is very great. The Coppice being well defended, and left to itself, will surprize him by its Shoot of the first Summer, and afterwards it will grow in proportion Year by Year to the next cutting.

After a few Seasons it will be too strong to be hurt by Cattle: but if it happen either through the Owner's Negligence, or in Spite of his Care, that Beasts have got in and crop'd it the first Year, so that it does not thrive, for that is a certain Consequence; the only proper Method is to go over the Shoots at the End of September, and cut them down that there may rise new ones in their Place; and then to see that the Plantation be better defended than before. This is always worth while: for the Difference is great between the Growth of those Shoots in a Coppice which have received no Injury, and those which have been hurt.

CHAP. V.

Of Pollards, or Trees for Shrowding.

FROM the Management of Coppice Wood we are to advance to the Consideration of Timber Trees; but we are naturally stop'd between both, by a particular Kind of Growth, which is properly speaking, neither of the Coppice Wood, nor Timber Tree Kind: this is the Pollard; a Tree of any Sort cut off at ten or twelve Feet Distance from the Ground, and shooting

ſhooting out from that Part a Number of Branches or Poles.

Theſe Poles or Branches are called Shrowds, and the lopping them off is called ſhrowding of the Tree. Theſe are raiſed for the Supply of the Fire, and other ſmall Purpoſes; and are cut at certain Seaſons, not the ſame for all the Kinds, but in general according to their Growth.

Trees intended for ſhrowding, are planted ſometimes in Hedge Rows, and ſometimes in waſte Places: the Kinds that love Water along the Sides of Ditches; and thoſe that bear Dryneſs and Expoſure, on Commons, and in the moſt barren Places. The Water Trees, as they are called by ſome; that is, ſuch as love wet Places, are the quickeſt Growers, the others are according to their Kinds, more and more ſlow.

Pollards are inferior to Coppice Trees in the Quantity of Wood they yield, and in its Value; for the Coppice Wood is fit for many Purpoſes, that the Shrowdings of the Pollards can never anſwer, and therefore brings a better Price; but on the other hand, Pollards are maintain'd, as before obſerv'd, at a ſmaller Expence, indeed it may almoſt be ſaid at none at all; for they require no Fences, they take up no Quantity of Ground; and they are in their Shoots above the Reach of Cattle.

The moſt frequent and moſt profitable Trees for Pollards, according to the three diſtinct Uſes and Situations already named, are the Willow for watery Places; the Aſh for Hedge Rows, and the Oak for Commons. But each of theſe Situations will ſupport ſeveral others to Advantage; and there is ſcarce any Tree that may not be brought to a Pollard at the Owner's Pleaſure.

In general, the Huſbandman ſhould ſhrowd ſuch Trees as are not fit for Timber; or any from which he deſires to have a preſent Advantage, or which he intends ſhall ſupply his Family, or the Market, with Fuel quickly and readily: for there is no Growth ſo ſpeedy as that of the Tree which is ſhrowded.

Trees intended for ſhrowding may be raiſed in many Places, where it would not be worth while to have others, becauſe of the Injury they would do the Ground: for, as to ſhrowded Trees, the Farmer may have the Benefit of grazing under them, while the Tops are growing, ſo that little Produce of the Ground, where that is of any conſiderable Value, is loſt by their Growth: and when their Heads are ſo large that they injure the Growth of the Graſs, they make Amends another Way, for they then afford Shelter for the Cattle, the Neceſſity of which is ſufficiently known to every Grazier.

For the Planting of Trees intended to be Pollards, the Huſbandman ſhould follow theſe Directions.

Firſt, Let him obſerve what Kinds of Trees thrive beſt in the Hedges, or on the Commons about his Neighbourhood; and let this direct him in the Choice of the Kinds for his Pollards.

When he is thus determin'd which of all the Kinds of Trees that are fit for Pollards to raiſe, let him mark out the proper Places whether in Hedges, by Ditches, or on waſte Ground; and let him not ſet them too near one another; for in that Caſe they would defraud one another of Nouriſhment.

For the Generality, the neareſt they ſhould come to one another is forty Foot Diſtance. The Aſh may be planted ſomewhat nearer than other Trees in general, and the Elm nearer than any other Kind: but in this Deſign of Shrowding, between thirty and forty Foot ſhould be the neareſt they are ever allowed to ſtand, let the Soil and Situation be ever ſo good.

Having fix'd upon the Kinds and Places, I would have him raiſe them by planting, not by ſowing; for, in this Caſe, that latter Method would be tedious and unneceſſary. Let him therefore take the young Trees out of his Nurſery at three or four Years Growth, and plant them where he deſigns.

I am particular in adviſing the Huſbandman to take the young Trees out of his own Nurſery, becauſe he will take Care, as before directed, to have that upon a very poor Soil, whence the young Trees being brought to a ſomewhat better, if not entirely good one, will ſhoot vigorouſly.

The Heads of theſe young Trees are not to be cut off at the Time of their Tranſplanting, for two very ſubſtantial Reaſons. Firſt, if they be of the light and pithy Kind, the Wet will be likely to rot the Top where it is cut; and in the next Place, they are not of a due Height, for the Part whence the ſhrowded Tree is cut off, muſt riſe above the Reach of Cattle; elſe they will crop and mangle the young Shoots, and the Shrowding will be worth very little.

At whatever Age Trees are planted, they are not to be cut off for Shrowds till they have ſtood a Year or two to get firm and ſecure Rooting. The beſt Time for doing it is in Spring; and the whole Care reſpecting the Height is, that it be ſuch as to prevent the Miſchief juſt named by Cattle.

In ſome Caſes the Huſbandman may find Trees of a conſiderable Growth, that he ſhall think it worth while to cut off for Pollards; as the Poplar, Willow, and ſome others: but he muſt do this carefully, and the beſt Rule is, that he cut them off at ſome Place, where there is a good Side Shoot to draw the Sap; otherwiſe it is often ſeen that a Tree of this Bigneſs periſhes under the Operation.

The Trees, of whatſoever Kind, being thus cut off, are to be left to Nature, for the ſhooting out of Poles or Branches. Theſe will appear ſoon, and grow very faſt: and when they are of ſuch a Bigneſs as to anſwer the Huſbandman's Purpoſe, he is to lop them. With reſpect to the Time they are to ſtand, no Rule can be given, any more than they could about the Copſe Wood, becauſe ſome Kinds of Trees grow much quicker than others, and the ſame Kind will require a different Time to come to Uſe, according to the Soil and other Circumſtances. The Owner's Eye therefore muſt be his only Rule in this Caſe: he is to conſider the Nature of his Occaſions, and to cut them down when they are fit for thoſe Uſes. Obſerving always that in theſe Shrowds, as in the Growth of Coppice Wood, the Value is always greatly increaſed by allowing a Year or two more in Growth.

The Seaſon for ſhrowding or cutting the Shoots of Pollard Trees, differs in ſome Degree according to their Kinds. As to the Oak and other hard Wood Trees, when they are made Pollards, the Shrowds may be cut at any Time between Autumn and Spring; but it is beſt done in Autumn: but on the other hand, the Willow and other ſoft Wood Trees, including the Aſh, ſhould never be ſhrowded, except in Spring; for if it be done in Autumn, the Winter Rains will be very apt to damage, and will often deſtroy the Tree.

To prevent this Miſchief in any Caſe, Care muſt be taken in cutting off the Shrowds of all theſe Trees, but eſpecially of the ſoft Wood Kinds, that they are cut off carefully in a ſlopeing Direction, and with a ſharp Inſtrument: for in theſe, as in the Coppice Wood Shoots, all haggling of the Stumps does great Miſchief. More depends upon the employing a good and careful Workman on theſe Occaſions, than any one will be aware, who has not minded the ſeveral Conſequences.

Finally, for the laſt Article in the Management of Pollards, I ſhall direct the Huſbandman to fell or ſtub them up at a proper Time; for they do not laſt like other Trees that grow upright and naturally. Pollards uſually, after ſome Loppings, grow hollow and decay. In this Caſe they not only loſe their Value in the Trunk, but the Produce of the Head is leſs, and of ſlower Growth.

For this Reaſon I adviſe the Huſbandman to provide for a Supply in Time, by planting a young Tree of the ſame Kind between every two, and ſhrowding it at a proper Growth. When he is thus prepared let him watch all his old Pollards, and take them before they decay. Cutting them up at this Time they will yield a conſiderable Quantity of good Wood: the beſt of it will be fit for ſome mechanical Uſes according to its Kind, and the worſt for Fuel.

I have ſaid theſe old Pollards are to be fell'd or ſtub'd up; but from Experience I altogether prefer the latter Method. The Price of ſtubing them up will always be return'd in the Quantity of Fire Wood yielded by the Root; and the young Trees will thrive vaſtly the better, for the clearing and ſtirring of the Ground.

In this Manner I would have a Quantity of Pollard Trees always kept up about a Farm, and by the Method here laid down there will be a Supply of them from Generation to Generation.

BOOK IV. PART II.

Of the Management of TIMBER TREES.

CHAP. VI.

Of Timber Trees in general..

THE Plantation of Timber Trees is an Article of vaſt Conſequence to the Publick, as well as of great Advantage to private Perſons: their Uſes in building, and other neceſſary Articles of Life, are ſufficiently known; and our Navy depends upon them. Their Value to the Poſſeſſor is often ſuch as to recover an half-ſunk Eſtate: ſo that, taking in the whole of the Conſideration, it is not eaſy to name any thing a Man can do, that is more for publick and private Advantage together, than planting. It is cheap, and it is eaſy; and it is of all Methods the beſt in which a Man can make Atonement to his Succeſſors for his own Extravagance: and he who ſets about it with Spirit, ſhould conſider he is working for himſelf, his Heirs, and Poſterity.

Theſe are the natural and plain Advantages of planting Timber and Foreſt Trees, and yet the Care of it is, in a Manner, loſt. Neither Laws nor Reaſon ſeem able to affect Men againſt their immediate Intereſt; nor will any thing tempt them to look farther. The Heir cuts down Wood without the leaſt Thought of providing for his Heir, who may probably enough be left in real, in the Place of his imaginary Wants. We ſhall be happy if, by ſetting forth plainly, in the enſuing Sheets, the Eaſe of planting Timber Trees and their Value, we can raiſe again a Spirit for ſetting about that uſeful Work, at the ſame Time that we deliver the neceſſary Directions for the doing it in the moſt ſucceſsful Manner.

Timber, or Foreſt Trees, are planted in Woods, in Parks, in Avenues, and in Hedge Rows, and they ſucceed very well in any of theſe Ways. They may be raiſed from Seed either in the Places where they are to remain, or in Nurſeries, and removed by Tranſplantation; the latter is the more common Way, but the former is the better: this I affirm from what I have ſeen on repeated Trials. The Method by ſowing will ſeldom, however, be prefer'd, becauſe of its Slowneſs; People are eager to ſee the Effects of their Labours, and the other Method ſhews them moſt readily.

When Timber Trees are to be rais'd by tranſplanting, the Sets are to be had from a Nurſery: and the Directions which have been given on that Head, for the raiſing the Supply for Hedges and for Coppice Wood hold good here. The Poorneſs of the Soil of the Nurſery is alſo a particular Article to be regarded in this Caſe.

The Diſadvantage of Trees rais'd by tranſplanted Sets, in Reſpect of thoſe from Seed, is owing principally to ſome Check they receive in the tranſplanting; and this is ſure to be greater when they are removed from a better than from a worſe Soil: the only Thing that could make Amends for the Stop naturally made by this, is the removing them into a Soil ſo much better than their own, that they ſhould feel it inſtantly.

A great deal of Good is to be done alſo, and a great deal of Miſchief to be prevented, by the Method of tranſplanting, of this we ſhall ſpeak at large hereafter: but in this Place there comes a more immediate Conſideration, that of the Soil in which the Plantation ſhall be made.

In this there is a great deal of Difference between the Plantation of the Coppice Wood Shrubs or the Pollard Trees, and that of Foreſt Trees. The former Kinds are intended for immediate Growth and immediate Uſe; but theſe latter are to ſtand a long Time, and on their Strength and Soundneſs, at the End of ſo many Years, depends entirely their Value. This will be more certain in ſome Soils than in others: thoſe Soils, where there is Choice, are therefore to be prefer'd. In general the Trees of theſe Kinds will ſhoot quickeſt in the lighter Soils; but it is in the firmer and ſtronger they grow to the greateſt Value. An Oak in a clayey Ground, makes ſlow Advances, but the Timber is never ſo perfectly firm and ſound as when it grows on this particular Kind.

We are not, however, to infer at once from this, that clayey Soils are the beſt for Trees. A particular Inſtance is not to be advanced into a general Rule: other Soils agree with other Trees; and very well, though not ſo well with the Oak; there is no Need therefore to be particular in the Preference.

The Coppice and Pollard Trees may be planted on any Soil; but 'tis not ſo with the others: as we are to look upon a Plantation of Foreſt Trees as a publick Benefit, we ought to wiſh all poſſible Succeſs to thoſe who undertake it, and to contribute to it by all poſſible Means. In the firſt Place then, the better is the Soil, ſo much the fitter it is for large Trees; and one particular Conſideration comes in here, which is, the Depth. The beſt Soil imaginable, if it lie over a Bed of Rock, though at ſome conſiderable Depth, will ſtarve large Trees: a much poorer with Depth is better.

Without Exception, the richeſt and the deepeſt Soils produce the largeſt and the faireſt Trees. The Quickneſs of their Growth depends, in a great Degree, upon the Goodneſs of the Soil, but their abſolute Growth to their proper Bigneſs and Strength on its Depth. We ſhall find this, on Examination. If we bore into the Earth where Trees grow tall, fine, and regular, we ſhall find it always deep; and on the contrary, wherever the Soil is ſhallow, we ſhall ſee the Trees of the ſame Kinds ſtunted, crooked, and low; with no other Occaſion for that Alteration whatſoever.

Timber Trees would, in general, grow very well in our rich Paſture Grounds: the ſeveral Kinds that love a dry Soil in the higher Paſtures, and thoſe which love wet in the Meadows; but there is no Occaſion to ſacrifice ſuch Land to them: the beſt Method he who is about to plant can take, is to ſearch about his Ground for ſome Place where the Soil is deep, and the Land not turn'd to ſuch Account; and then, in whatſoever Form he chuſes to plant them, he will make it turn, in the End, to a much greater Benefit than any other Part, let what Uſe will be made of it.

There is no Need to be particular as to the Nature of the Soil, provided it have this great Article, already named, of Depth. In general, thoſe which are too dry are the worſt: and to name the beſt of all, it is the loamy Kind. No Matter what be the Colour: but a Soil of this Nature, compos'd, as has been already explained in the fourteenth Chapter of our firſt Book, of Clay, Sand, and a proper Quantity of vegetable Mould, and lying to a proper Depth, with ſome ſoft Bed under it, is the Soil that of all others the moſt univerſally agrees with Trees; and does beſt for all.

There is no Wonder in this Preference, when we examine the Nature of Things; for if we demand what is it that a Tree wants from the Soil in which it grows? the Anſwer is, a Firmneſs that will give hold to the Roots; an Openneſs that will let in the Rains; a Richneſs for Nouriſhment; and a Depth that it can pierce with its Roots in proportion as it advances in Heighth: now all theſe Qualities the loamy Soils have more than any other Kinds.

As to Depth, that is in ſome Degree accidental; but in the general, loamy Soils do not want it, for they are thicker commonly than others, and they uſually lie upon a Bed of Clay which the great Roots are able to pierce, while the others ſpread themſelves in the lighter Soil.

Then the Firmneſs that is in the Loam gives it a Body; and the Sand that is in it breaks it to let in the Rains: while the vegetable Mould, which makes the other Part of the Compoſition, ſupplies its Part of the Nouriſhment. Thus Loam has all the Qualities of theſe ſeveral Soils, and yet has not the Diſadvantages under which they lie ſingly: for though being all thus blended in Loam they make ſo admirable a Soil for Trees, they would neither of them do well alone, excepting for a few particular Kinds.

Clay will give hold to the Roots, but it is cold and has not Nouriſhment: even the Oak that grows ſo ſound in a clayey Soil, expects ſome Moiſture of vegetable Mould, for it does not ſucceed well in Clay alone. Sand that has Warmth enough, wants Body to hold the Roots. And as Clay will not admit the Rains, Sand, though it admits, lets them through, ſo that they do not remain long enough to be of Uſe to the Tree. In the ſame Manner vegetable Mould alone, which receives and keeps the Rains ſufficiently, and affords ſuch abundant Nouriſhment, does not give a ſufficient Hold to the Roots, becauſe it is too looſe and crumbly.

Loam, as we have ſeen, poſſeſſes all the Advantages of theſe ſeveral Soils, without being ſubject to their ſeveral Inconveniences, and therefore Reaſon declares it to be the beſt, as Experience ſhews it is; we ſee all Trees, without Exception, grow well upon loamy Soils; and moſt of them flouriſh: then, as there are certain Plants peculiar to Clay, which will not live in Sand, and ſome that delight in Sand and will not live in Clay, ſo it is with Trees: but in the ſame Manner as all theſe Plants, ſo all thoſe Trees will grow and thrive in Loam.

The loamy Soil then is that which he who is about to plant for Timber is to chuſe; and if he can with Convenience, I would adviſe him to fix upon ſome Spot where Trees have not grown before. For it will be the richer, as its nu-

tritive Parts have not been exhauſted by former Growths.

Some carry this ſo far as to adviſe a Piece of Ground on which no Crop has ever grown; but this is a needleſs Caution, for Timber Trees are to ſeek their Nouriſhment principally at a Depth, to which the Roots of Corn, and other of the common ſuperficial Crops, do not deſcend.

When he has thus fixed upon his Spot, I would adviſe him to uſe the ſame prudent Caution that was recommended on the Subject of Coppice Woods. That is, that if the Soil be not exactly what he could wiſh, he ſuit the Trees to it: and if it differs in ſome Places from what it is in others, he is to uſe the ſame Caution of planting in thoſe particular Places, ſuch Kinds of Trees as that particular Soil agrees withal.

Thus if his Ground be throughout much inclining to the clayey; or what is called a very clayey Loam, let him plant in it the greateſt Quantity Oak: if it be too much tending to Sand, let him plant Aſh in the greateſt Number; and in the ſame Manner let him ſuit the Growth to the Soil, according to thoſe Directions which ſhall be given at large, when we come to treat ſeverally of the Kinds of Foreſt Trees.

At the ſame Time if only ſome one Part of the Ground be very clayey, let him there plant Oak; if ſome Part ſandy, let him here ſet Aſh and Sycamore; and in like Manner if any Spot be particularly wet, let him there plant the black or white Poplar, and ſuch other Trees as love a wet Soil; the ſeveral Kinds of which will be pointed out to him at large hereafter.

CHAP. VII.

Of raiſing Timber Trees from Seed.

WE have obſerv'd in the preceeding Chapter, that ſome raiſe their Plantations of Timber Trees from Seed upon the Spot where they are to remain, others in Nurſeries from whence they remove them by tranſplanting, when they have arrived at a proper Growth. As we have already done in regard to the ſmall Wood for Coppices, we ſhall do in reſpect of theſe: we ſhall deliver the beſt Method of doing each; and the ſeveral Cautions to be obſerv'd in the Practice.

The Seeds of theſe large Trees, are in general large alſo; and they therefore are not to be ſown by ſcattering them at random over the Ground, or ſpreading them in Trenches. They are to be ſet in regular Rows by a Line, putting them carefully into the Earth, and ſeeing them well cover'd. This is the Practice when they are to be rais'd in a Nurſery for tranſplanting: but when they are ſown where the Trees are to ſtand, another Method is to be follow'd, and the Succeſs is more certain.

To this Purpoſe having fix'd upon the proper Places, and Diſtances at which the Trees are to ſtand, a Hole is to be open'd in the Earth for each Tree with a Spade. Let this be dug two Spit deep, and about two Foot ſquare. Let the Earth be well broken, and put in again; and then four or five Acorns, or of whatever Seed is choſen, be carefully ſet in this new ſtir'd Ground.

Let this be done in the Beginning of OCTOBER. When the Ground is laid level over the Seeds, lay a black Thorn Buſh lightly over it, and then raiſe a little dead Hedge, or a ſlight paling round it; and thus leave it till the Seeds ſhoot. This may be called by ſome a troubleſome Method; and indeed it is more troubleſome than the common Way of Planting, which ſpoils half the Trees by Neglect; but all the Expence of digging for a large Plantation will come to but little; and for the reſt, 'tis only doing earlier what in open and expoſed Plantations others do later.

If the Place where the Plantation is made be within a good Incloſure; and no other Uſe be made of the Ground, this Care of fencing round the Seed Spots may be omitted; but there will always be Danger. In the Method here preſcrib'd, the Ground may be uſed for the common Purpoſes of Huſbandry, all the Time the Trees are growing up to a Heighth; and they will be defended by the firſt Work, till they are out of the Reach of Danger.

No Method ſo well gives Trees the Advantage of growing up for the firſt Years in perfect Security and Quiet; and few conceive how much the future Beauty and Value of the Tree depend on that Article. The leaſt Hurt from Man or Beaſt, while young, may blemiſh a Tree for ever: nay, the very blowing of the Wind will ſometimes do it an irreparable Miſchief. It is at this Seaſon only they require Care, but here they really require the greateſt.

According to this Plan, the Owner will be ſure of every Step he takes: he will have a Plantation, every Shoot of which ſhall certainly thrive; and every Tree be regular and beautiful: and this is the Method we prefer for raiſing Plantations, though we ſhall do Juſtice alſo to the other.

When the Seeds in theſe ſeveral Spots have ſhot above the Ground, let the Place be kept clear of Weeds, and their Growth for a little Time carefully watch'd. As ſoon as they are ſo far advanced that the Eye can judge of them, let one be marked for the reſerved Plant that is to ſtand, and be the future Tree; and let the others be drawn up and ſet in Hedge Rows, Coppices, or where the Owner pleaſes; leaving the favourite Shoot alone to have the Benefit of the Ground. This will ſhoot up at a ſurprizing Rate, and almoſt always with perfect Regularity. If from any Accident it prove faulty, let it be taken up, and one of the beſt of thoſe that had been tranſplanted, again removed and ſet in its Place, watering, and ſhading it, which may eaſily be done by means of the Hedge or Paling; and uſing every Method to forward its Growth, that it may not be too far behind the others.

Thus is a Plantation of Timber Trees rais'd by ſowing; and no farther Trouble is requir'd about them.

CHAP.

CHAP. VIII.

Of propagating Timber Trees by Tranſplantation.

IF the other Method by tranſplanting be prefer'd from the particular Fancy of the Owner; or from the particular Circumſtances of his Situation, which may ſometimes reaſonably influence him to make that Choice, though naturally and generally the other is beſt, the following is the Method to be obſerv'd.

Firſt then, let a Spot be choſen for a Nurſery on a poor Soil; and let the Seeds of the ſeveral Timber Trees intended to be raiſed, be ſet according to the Directions before given by a Line. When they are come up, let them be thinned where they have riſen too thick, pulling up the weakeſt Plants.

When the others are of a proper Growth, let them be tranſplanted into the Places where they are to ſtand, obſerving the following Directions; on the punctual regarding of which, a great deal of the Succeſs of this Undertaking will depend. All Trees are injur'd by removeing, but that Hurt is uſually much greater than it need be from the improper or careleſs Manner of removing them.

In the firſt Place, as to the Time of tranſplanting them, the beſt is when they are of two Years Growth. Moſt People do it later, but I have found fewer Accidents when they were thus young, than at any other Time.

Let them be taken up out of the Nurſery with more Care than is uſually allowed. Let the Place be open'd to receive them; and let them be brought to it with as much of the Earth of the Nurſery about the Root as poſſible.

Let the large ſtrait downright Root, in ſuch Trees as have one, be cut off at the End; and the Hole be deep enough to receive it without bending. This is what is called the Tap Root; and the preſerving it in its proper Direction, is of great Conſequence to the regular Growth of the Tree. Let the other Roots be as evenly laid in, and as little cruſh'd and injur'd as poſſible: and when the Earth is put over it, let it have a careful watering to ſettle and fix it about them.

Let Care be taken that the Hole into which the young Tree is ſet, though deep enough to receive the tap Root, be not ſo deep as to bury the others below the beſt Part of the Soil. This is a common Fault of thoſe who in ſmall Plantations will be over careful. By this Miſtake they ſet all the young Roots in a Clay or a Gravel, whereas they might have diſpoſed them in a good vegetable Mould. The lodging theſe Roots carefully in the beſt Part of the Soil, and keeping them evenly diſpos'd, and well ſpread out, with Earth between them, is a very great Article: and to this Purpoſe when the Soil is very thin or ſhallow, it is beſt to keep them in it, and if need be, to raiſe the Earth about the Bottom of the Tree, rather than ſink that too low.

The Diſtances at which they ſhould be planted, we have already ſaid depend upon the Nature of the Tree. The Oaks ſhould ſtand at forty Foot Diſtance every Way: the Elms at thirty; and all other Trees at ſome middle Diſtance between theſe. This, and the other particular Directions, will be given in treating ſeverally of the diſtinct Kinds; we are here ſpeaking of Planting in general.

In the ſame Manner is to be underſtood the Preference given to ſowing above tranſplanting: it is deliver'd of Trees in general. We ſhall ſhew hereafter how either Method ſuits beſt with each particular kind of Tree.

The Directions here laid down will enſure a general Succeſs, when they are practiſed with due Care in the Tranſplantation of Trees of two or three Years Growth. But as it is a common, and, in many Caſes, a very right Practice, to remove ſuch as are of a larger Size, it will be uſeful to ſet down here the Cautions and Expedients which are to be uſed in removing them, and to aſſiſt the Succeſs.

When a Tree of ſome conſiderable Growth is to be removed, let the Hole in which it is to be ſet be thoroughly prepared before it is brought; and in the taking it up out of the Nurſery, let there be as large a Quantity of its own Earth as well may be, removed with it, and kept cloſe to the Roots.

Before it is taken up, let there be a Mark made upon its Bark with Chalk, facing the South; and let Care be taken in the ſetting it in its new Place, that this Mark faces due South again.

There is more Reaſon for this than is generally imagin'd, for the Sap naturally riſes moſt in all Trees on that Side which is next the Sun; and if the ſame Side be not kept next in the Removal, this alone will make a Confuſion, and be a Check upon the Growth; which is the great Thing to be avoided in Tranſplantation.

The beſt Seaſon for tranſplanting Trees which are ſomewhat grown, is in the latter End of October: for the young ones 'tis as well to do it ſomewhat earlier. The watering of new planted Trees, which is ſo neceſſary to all, is the more needful as they are the larger; and they will then bear it alſo in greater Quantity; for too much Water in a cold Seaſon to a very young Tree ſometimes chills it.

Particular Care muſt alſo be taken in theſe Caſes, to ſpread thoſe Roots evenly which ſtand out beyond the Clump of Mould taken up with the Tree; and to cloſe the Earth well about them.

When the Tree is thus planted upright and ſteady, it muſt be ſtaked up to keep it ſo. One or more Stakes are to be thruſt firmly into the Ground for this Purpoſe, and the Tree is to be faſten'd to them with a Hay-band; and it is always good to put a Handful of Moſs between the Stakes and the Tree, that they may not rub and injure the Bark.

If it be planted where Cattle may damage it, it muſt be ſecur'd by Buſhes of black Thorn, or by a Hedge, or paling round it: for they will prevent many a Tree from growing, by rubbing themſelves frequently againſt it; beſide their injuring it by cropping it if in their Reach.

Farther, to ſecure the Succeſs of the Plantation, it will be proper to lay a Quantity of freſh cut Fern, or Pea or Bean Stalks, or any Thing of that Kind, all about the Roots. This ſerves to keep the Earth moiſt about them; and by Degrees theſe Plants rot and decay, and the Earth receives their Subſtance, which is waſh'd in by Rains as a Manure, greatly improving the Soil, juſt when it is moſt wanted; and promoting the Growth of the Tree when there is the Fear of its being check'd by the Removal.

If the Place or Seaſon make it inconvenient to get any of theſe Things to lay about the Root of the Tree, it is adviſeable to lay a good Quantity of large Stones there. Theſe anſwer the ſame Purpoſe in keeping the Ground moiſt; and they alſo preſs it down ſteady and firm to the Roots.

CHAP. IX.

Of tranſplanting Trees at a large Growth, or at improper Seaſons.

AS there may ſometimes be Occaſion to remove Trees of a very large Growth, or at an improper Seaſon of the Year, we ſhall add here the beſt Methods for doing either; and the Cautions that are neceſſary to be uſed to prevent the Loſs of the Tree, which naturally would happen, if ſuch Tranſplantations were ſet about raſhly, and without the neceſſary Care.

When there is Occaſion to remove a very large Tree, the Method to be taken is this. A Year before the Time let the Earth be open'd at ſome moderate Diſtance in Form of a Trench; ſo as to leave a Ball of Earth about the Stump, of five, ſix, or more Feet in Diameter, according to the Bigneſs of the Tree. When this Trench is dug to the needful Depth all round, and the Side Roots at that Depth are all cut through, let a Rope be applied to the upper Part of the Tree, and by the Strength of three or four Men, let the Tree be pulled on one Side till the Workman can get at the ſtrait downright Root or tap Root. Then let him cut through that Root with his Axe, and when this is done, let the Tree be ſet up ſtrait again. When it is up, let the Earth that was dug out of the Trench be thrown in again, and then tying two more Ropes round the upper Part of it, drive three Stakes at ſome Diſtance in the Ground, and faſtening the other Ends of theſe Ropes to the Stakes, the Tree will be able to ſtand againſt the Wind, which otherwiſe would blow it down; as which ever Way it is bent by the Blaſt, there will be a Rope to pull againſt it. In this Manner let the Tree ſtand till that Time next Year; or if this have been done in Time, and it be allowed to ſtand two Years, it is the better.

The beſt Seaſon for removing it, is juſt after a good Froſt. Let the Hole in which it is to be ſet be made ready; and the Earth about the Root well wetted before the Froſt, that it may bind together in a firm Lump about the Root; and in this Condition let it be removed and ſet in the Hole where it muſt be ſecured by Ropes and Stakes as before directed.

If Trees are to be tranſplanted in Summer, the great Art is in preparing the Earth for their Reception. They muſt be taken up with all the Cautions already given, and the Earth ſhould be wetted to make it hold together about them. Then in the Hole where they are to be planted, there muſt be a large Quantity of fine Mould mix'd with Cow Dung, and beaten up with a ſufficient Quantity of Water to reduce it to a Paſte.

When the Hole is thus prepared, the principal Branches of the Tree muſt be ſhorten'd; and it muſt be removed with a good deal of Earth about the Root; it muſt be ſet upright in this Paſte, and fine Mould thrown in and preſſed down upon it: then the Hole being filled up, is to be cover'd with Turf; and a Quantity of Stones laid all about the Bottom of the Trunk to keep the Ground moiſt, and to preſerve the Tree ſteady.

In this Manner; and by theſe Methods carefully follow'd, Trees may be tranſplanted when of ever ſo large a Size; and at ever ſo improper a Seaſon. But theſe are Occaſions which ſeldom offer in the Huſbandman's Way, Pleaſure demanding them much oftener than Advantage. We have, however, given the Rules for doing it, that nothing might be omitted; and having thus treated at large of raiſing and tranſplanting Trees in general, we ſhall advance to a full Conſideration of each Kind in particular; and of the peculiar Management each requires.

BOOK II. PART III.

Of the ſeveral Kinds of TIMBER TREES.

CHAP. X.

Of the Oak.

WE have already ſpoken of the Oak at large among other Timber Trees, in delivering what in general concerns their raiſing; but we are here to conſider that of this Tree in particular. We ſhall in this, and the ſucceeding Chapters, as much as poſſible avoid Repetitions of what has been ſaid already in that general Diſcourſe; reſerving to each Head what is, in ſome Degree, peculiar to each Tree.

The Oak is a large Tree with a rough Bark, ſpreading Branches, and large Leaves, deeply

wav'd at the Edges: the Flowers are inconſiderable, they are a Kind of brown Threads: the Fruit is the Acorn, ſtanding in a Cup, and growing in ſome Trees on a longer, and in others on a ſhorter Foot Stalk; from which Difference ſome have diſtinguiſhed two Kinds of Oak. Others have, in the ſame Manner, divided the Oak into two Kinds, one of which riſes more in Height, and the other, which they call the wild Oak, ſpreads more into Branches. But theſe are accidental Varieties, not diſtinct Kinds.

The Oak will grow in almoſt any Soil: this we ſee in Fact, becauſe we find Oaks on all Kinds of Land. We ſee it on clayey, ſandy, and ſtony Ground; but thoſe who have made ſtrict Obſervations declare, that in the clayey Soils it obtains moſt Firmneſs, but in theſe the Growth is ſlow. The beſt Earth for Oak, where there is Choice, is a rich Loam. This is a ſound and commonly a deep Soil. Too much Wet is an Enemy to the Oak, ſo that it ſhould be guarded againſt; and 'tis principally for this Reaſon that it grows beſt on ſomewhat riſing Grounds, for they are naturally more dry than the abſolute Flats on which the Wet lodges and remains.

When the Ground is too moiſt the Oak puts out moſt Branches, and the Trunk is defrauded of its due Nouriſhment; in very dry and expoſed Places it grows low and ſtubbed.

The Timber in too moiſt Ground is ſofter, and in theſe hilly and barren Places it is harder than its uſual Quality, but 'tis there of an uneven Grain, and leſs uſeful.

The fineſt Oak Timber is that which has grown on a firm good Soil, rather enclining to Clay than any other particular Quality, and where there is not too much Moiſture.

The Oak is propagated three Ways; firſt, from Seed, or the Acorn; ſecond, by raiſing in a Nurſery, and then tranſplanting; and, thirdly, by taking up young Sets out of the Woods, where they have riſen from the fallen Acorns, and are uſually plentiful enough.

Of theſe Methods I altogether prefer that of raiſing the Oak from the Acorn, in the Place where it is to grow. The Oaks from the Nurſery are commonly twice tranſplanted to come to their ſtanding Place, and this gives them two Checks greater or leſs; and diſpoſes them twice to an Unevenneſs in the Growth: as to the Sets taken out of Woods, they are the worſt Way of all. Idleneſs or Frugality may tempt thoſe who will not raiſe, or purchaſe the young Sets out of a Nurſery to do this, but theſe wild ones having been rais'd under too much Shade, are uſually very ill ſhaped; and as they are planted out into more expoſed Places, they commonly get an ill Growth.

CHAP. XI.

Of raiſing Oaks by Tranſplantation.

IF any one in ſpite of theſe Diſadvantages will plant the wild Sets, the Method he is to take is to cut them off cloſe to the Ground, with a ſharp Knife, and by a ſlanting Stroke, as ſoon as they are planted. This gives the Root Time to recover ſome Strength, and as it affords a new Shoot, that is often better than the original Plant. But in this Caſe the Diſadvantage is plain, for it is evident that it would be better this Shoot roſe from the Root than from a Stump.

Thoſe who raiſe Oaks in a Nurſery for Tranſplantation, muſt obſerve a different Method from what is to be followed by ſuch as ſow them where they are to ſtand. They are to proceed thus. Let the Acorns be ſhook, as ſoon as fully ripe, from a ſtout Branch of a well growing Oak; and immediately ſown in the Nurſery, for the Air withers them.

They are to be ſet in Lines, at two Inches aſunder, and about two Inches and an half deep in the Ground. They will ſhoot the ſucceeding Spring, and they ſhould be ſuffer'd to ſtand till that Time Twelvemonth: then they are to be tranſplanted into another Part of the Nurſery, and ſet at eighteen Inches Diſtance, in Rows three Foot aſunder. They are to be watered a little when firſt tranſplanted, but this muſt be carefully done, for too much Water is apt to hurt the Oak, eſpecially when young.

The Oak is a particular Tree, and requires, as well as deſerves, a particular Care in its Management. In many little Reſpects the Conduct is to be different from that obſerved in the raiſing the Generality of Trees; and it is to a Want of Regard to theſe, that ſo many young Oaks are loſt more than of other Trees.

The young Trees thus tranſplanted are to be watered ſometimes in dry Seaſons, and kept clear from Weeds. It is alſo good to dig between the Rows: for this, by breaking the Soil, affords them a greater Supply of Nouriſhment, and at the ſame Time it cuts off the ſtragling or far-ſpreading Roots, which will make the young Trees bear their next Tranſplantation the better.

During the Time they ſtand in theſe Beds they are to be regulated in their Growth, but in this only a little is to be done. They who cut off the Head deſtroy the Tree, for if there be not a leading Shoot to conduct the Top, the whole will periſh. Neither are many of the ſide Branches to be taken off, but only ſuch as tend to too much ſpreading. The Planter is to remember that the Trunk of the Oak is to be his beſt Benefit; he muſt therefore cut off ſuch very ſpreading Branches, as would draw the Sap away from it and ſtarve it: but it is prudent to leave a competent Number of the others, to draw up the Sap. When an Oak in this young State is too cloſe prun'd, the Head is always ſeen to grow over proportioned, and weighs down the Tree and ſpoils its future Progreſs.

When the Trees have thus ſtood about four Years; that is, when they are between five and ſix Years old from the ſowing, they may be conveniently tranſplanted. They are at this Time of a pretty Size, and having been thus prun'd ſhew well. It is dangerous to move them in the common Way, when they are older, for the Oak bears removing, when grown to a Size, worſe than any other Tree.

The Time for tranſplanting them is juſt before they begin to ſhoot; and it is prudent to chuſe a ſhowery Seaſon: if no Rain fall they muſt

muſt be gently watered, as before directed, and ſtaked up to keep them ſtrait.

This is the Method for raiſing Oaks by Tranſplantion; and when they are wanted for Beauty and Ornament, as for Chumps in Parks; and for Wilderneſſes in large Gardens, this is a very good Way, becauſe they may be had of a proper Growth from the common Nurſeries: or from the Owner's own Stock, rais'd there for other Purpoſes. But when Oaks are intended for Timber; and Uſe and Value are more ſtudied than Ornament; 'tis by much the beſt Method to raiſe them from the Acorn, in the Places where they are always to continue.

CHAP. XII.

Of raiſing Oaks from the Acorn.

THE Directions which have been given for raiſing Trees in general from the Seeds, in the laſt Chapter, might ſeem here, and on the like Occaſions hereafter, the Repetition of a great many needleſs Words; but in each we ſhall deliver whatſoever there is required particular for the raiſing of each Kind.

When the Oak is to be rais'd immediately from the Acorn, a different Method, and different Seaſon are to be obſerved for ſowing.

Let the Acorns be gathered when full ripe, from a thriving Tree, and immediately ſpread upon the Floor of a dry ſhady Room: when they have lain a Week, frequently turning them, let them be put up in large Garden Pots, with a Quantity of dry Sand, and laid by for the Winter.

Early in Spring let the Ground be marked out where the Plantation is to be made, and at the Diſtance of forty Foot every Way, let the Holes be open'd for receiving the Seed. Theſe are to be dug two Spit deep, and the Earth well broken, four or five Acorns are to be put into each, and cover'd two Inches deep, and when they have ſhot, and acquir'd a little Growth, all the Plants, except the one beſt in each Hole, are to be taken up as directed at large in the laſt Chapter. And that ſingle Plant in each Hole is to be nurſed up for ſome Years with due Care.

The Head of theſe young Trees is to be ſuffered to grow, and none of the Branches are to be cut away, except ſuch as ſpread out too wide, as in the Nurſery; and if it happen that in ſpite of the Care in the Choice of thoſe Shoots which have been ſuffer'd to ſtand, any one be uneven; the beſt Method is to cut it off at the Ground, and wait for a new and better Shoot.

A Plantation of Oak thus made, if the Soil be tolerable, is a Fortune for the Succeſſor in the Eſtate; but it is not limited to that; Men enter too late upon theſe Studies, otherwiſe they might reap the Benefit of their Plantations themſelves. If a Man would begin to plant at eight and twenty, and ſhould live to ſee ſixty-three, there is a Space of five and thirty Years, which is a Time for raiſing even an oak Plantation, ſlow as that is in Growth, to very conſiderable Value, though not to its full Price, or nearly to that.

It is not eaſy to give what can be call'd a middle Calculation for the Growth of the Oak, it differs ſo prodigiouſly in Reſpect of the Soil, Situation, and other Circumſtances. But this I can ſay from my own Knowledge, that Oaks are now to be ſeen in this Neighbourhood, which were planted thirty-four Years ago in the Acorn: And the leaſt Tree among them is fourteen Inches diameter in the Trunk.

An Oak of this Bigneſs is but advancing toward the proper Time of felling, and towards its Value; but if the Neceſſities of the Owner induced him to fell theſe at this Time, the Price of the worſt Tree among them would pay for the Labour and Charge of the Plantation.

If the young Plants, when they riſe in theſe Spots, appear almoſt above the Ground, or ſtand too high with their Roots, the beſt Method is to lay up a Parcel of fine Earth againſt the Bottom of that which is the moſt thriving Shoot. This happens ſometimes from the Acorns being not ſet deep enough; and ſometimes from the Weather: for after a Froſt the Mould will riſe, and bear up the young Shoot with it.

Acorns are not to be buried too deep, eſpecially in a moiſt Soil, for they often rot: and, on the other hand, they muſt not be ſet too ſhallow; for it not only makes the Shoot ſtand too high; but frequently the Field Mice find them out, and devour the Hopes of the Plantation.

The Quantity of Ground taken up by this Plantation, at forty Foot diſtance, is not to be ſuppoſed waſted: for though the Oaks will, in their larger Growth, require that Diſtance, they do not at firſt. For many Years Aſhes may be rais'd upon the Ground between the Oaks, for Poles, and cut to a great Advantage. Underwood of all the ſhrubby or Coppice Wood Kinds, may alſo be planted for a Time, if the Ground be fit for it; or it may be graz'd, and will loſe little of its Value for many Years. Nay the planting the Trees at this Diſtance is the only Way to preſerve a Value in the Ground for theſe Purpoſes; and when the Soil is good, it will continue to yield fine Paſture.

For an Inſtance of this I need not ſend the Reader farther than to that elegant and noble Plantation BUSHY-PARK: where, all about the Caſcade, he will ſee Oaks of a very noble Growth, at about forty Foot diſtance, more or leſs, and the whole Surface of the Ground under them as green as the fineſt Meadow.

CHAP. XIII.

Of the Uſes of the Oak.

NO Plantation whatſoever exceeds that of Oak, when made in this Manner: and to thoſe who will ſuffer it to ſtand a proper Time, none equals it in Value. By this Management the Trees will all riſe with a ſingle ſtrait and upright Stem, and their Branches ſpreading every Way with a beautiful Regularity, make, when cloathed with their large and fair Leaves, a beautiful Appearance. Their Shade is preferable to that of any Tree whatſoever: their very Imperfections and Excreſcencies, the Oak Apples, Oak Cones, and Oak Grapes are beautiful; and the Air is perfumed and rendered healthy by blowing over them.

Among

Among the Excreſcences of the Oak I have not followed the common Cuſtom of ranking the Herb, call'd Miſletoe; becauſe it is not an Excreſcence, but a regular Plant, riſing from its own Seeds, but whoſe Place of Growth is not the Ground, but the Bark of ſome Tree; and no Trees afford it ſo ſeldom as the Oak.

Its Fruit, which a good and well-grown Oak bears annually in vaſt Abundance, is an excellent Food for Hogs. No Fruit feeds them ſo well, it gives their Fleſh alſo an excellent Taſte. The Flavour of the Westphalia Hams is owing to this Food. They are made from wild Swine that live in the Foreſts; and it would, doubtleſs, be an Improvement of our Hogs Fleſh intended for that Service, if the Creature were fed with Acorns.

That they give a Flavour to the Fleſh of ſuch Hogs as eat them in Abundance, is not to be queſtioned; for our Country People, who are not accuſtomed to that Taſte in Bacon, always feed their Hogs ſome Time with Peaſe after the Acorns, to take off the Flavour.

The Effect of Food on Creatures in giving a Taſte to their Fleſh, is not to be doubted. The Heath-Cock of Germany is not eatable in Autumn, except by the Peaſants, becauſe its Fleſh taſtes ſo ſtrongly of the Juniper Berries he eats at that Seaſon; and as to the Effect of particular Food on Hogs, an Inſtance is given in the Phiſophical Tranſactions, of the very Bones of a Pig being ting'd red, by its eating Madder Root at a Dyer's.

The Hog is the Creature that eats Acorns moſt freely and naturally, and is beſt fed with them; but what Nature has meant as Food to one Animal, may, by proper Management, or in Neceſſity, be made Food to others; all Poultry will eat Acorns if broke ſmall, and given them among other Food, and nothing fattens them more. They have alſo been given to Oxen, and other Cattle, among their dry Food; and we read that before the Cultivation of Land was ſo well known, they were, in Part, the Food of Mankind.

Their Effect in fattening the Hog is ſupported by ſufficient Experience. A Peck of Acorns a Day, with a little Bran, will, it is affirmed, upon good Authority, make an healthy Hog encreaſe a Pound each Day in his Weight, for fifty or ſixty Days together.

The Bark of the Oak ſerves the Tanner, and fetches a large Price; the Dyers alſo uſe it: and it has been diſcovered ſome Years ſince, that the young Branches of the Oak cut and ground to Pieces in a Mill, anſwer all the Purpoſes of the Bark, and that in as great Perfection on theſe Occaſions.

We have mentioned Saw Duſt among the Articles uſeful as Manures; and Experience ſhews that none is ſo excellent for that Purpoſe as the Duſt of the Oak: this is natural enough, becauſe the Oak is the moſt firm and ſolid of all our Timber. Thoſe who have try'd the Experiment ſay alſo, that of the Kinds of Wood Aſhes uſed in dreſſing of Land, the Oak claims greatly the Preference.

All theſe however are but, as it were, accidental Articles of Value in the Oak; its great Worth is in the Timber, which in Solidity, Strength, and Soundneſs, exceeds all our other Kinds, and is therefore of all the moſt fit for great and laſting Uſes. Of all Kinds of Wood yet known in this Part of the Globe, the Oak is in its Service the moſt univerſal.

Beſide its prodigious Uſe in our Shipping, it is called for, on a thouſand Occaſions, in Buildings, and for Inſtruments. It reſiſts the Injuries of Weather more than any other Wood, which is not a Wonder, for even the Fire takes Effect upon it much ſlower than on any other Timber whatſoever: and ſome of it is ſo hard that the beſt Tools will ſcarce work upon it.

In Water-works, where the Timber is expoſed both to the Air and the Water, no Wood ſtands like the Oak: and no Wood is equal to it in the Support of Burthens. The Ebony and ſome other foreign Woods, when they are very hard and firm, cut as difficultly as Oak, but if they are try'd in the ſupporting of Burthens, they ſtart and fly under half the Weight that a Piece of Oak of the ſame Size will ſupport with perfect Safety.

Even the Defects, as they naturally appear of Oak, ſerve to give it Strength for certain particular Purpoſes. Thus it is not unuſual for an Oak Trunk to grow a little twiſted: this may be diſcovered through the Bark as it is ſtanding, but is very viſible when the Tree is fell'd and ſtrip'd: the Trunk of ſuch an Oak is uſeful beyond any other, for the ſupporting vaſt Weights. Where Poſts and Columns are required for ſuch a Purpoſe, nothing equals it.

In Buildings the ſtraiteſt, fineſt, and eveneſt growing Pieces of Oak are uſually wanted, and they bring their Price accordingly; but for Engines where a vaſt Strength is required, the Body of one of thoſe ſtubbed, and rough grain'd Oaks, which are not fit for other Purpoſes, and which are ſo hard that a Tool will ſcarce pierce them, is ſuperior to any thing.

There is no Oak, while ſound, that is not fitted for ſome Purpoſe. Thoſe Parts which will not do for greater Uſes makes Pales, Poſts, Coopers Ware, and Laths; all which bring their Price to the Owner: even the leaſt Pieces are worked into the Pins and Pegs us'd in tyling, and that Way are of Value.

Oaks that grow crooked, and are firm withal, make what they call Knee Timber for Shipping. The knottieſt and rougheſt Pieces are fit for Piles in Water-works; and Mill Wheels, and Spokes for other Wheels are made from the proper Pieces.

Beſide all the Uſes of the Oak in its various Conditions, conſider'd as a Timber Tree; we are yet to conſider it as a Part of the Coppice Wood Plantation; and no Kind is there more valuable. The Oak maintains its Character in every Condition, and is every where of Value.

When the Oak is ſown among the Coppice Wood, to be fell'd with it at twelve or fourteen Years Growth, it yields excellent Poles for Hoops. 'Tis uſual to make theſe of Aſh, and ſome take Hazel; but the Preference is due to the Oak Hoop beyond all Degree of Compariſon: the Aſh does not exceed the Hazel for Hoops half ſo much as the Oak exceeds the Aſh. An

Oak Hoop will laſt out ſeven of any other Timber.

The ſmaller Kinds of Poles ſerve as Staves, and the leaſt make our walking Sticks. The Root of the Oak where it is knotty and firm, has alſo great Beauty when uſed by the Turner or Inlayer.

Thus we ſee that this ſerviceable and univerſally uſeful Tree ſupplies us with Materials of all Kinds, as Timber, from the Ribs of a Man of War to a walking Staff, and from the main Beam of a Houſe to the Pegs in the Tiling: not the leaſt Particle of it but is uſeful. Even ſuch as is fit for nothing elſe in the Coppice Oak is good for firing, whether ſplit into Billets from the larger Pieces, or cut into Faggots it excels other Wood. The Charcoal that is made of the Oak is better alſo than any other.

CHAP. XIV.

Of the Growth of Oak Trees.

THE Growth of the Oak is not only very different on various Soils; but it has been found by nice Obſervation, to vary exceedingly at different Periods on the ſame Place. For Inſtance, an Oak has been obſerv'd to grow very freely and very well for twenty ſucceſſive Years: at the End of this Time it has come to a ſtop, and has for ten or a dozen Years made little Progreſs. From this Time it has begun to grow again, and has continued in its uſual Way increaſing viſibly in Height and Thickneſs.

This, though ſeeming to ariſe from ſome hidden Cauſe in the Tree itſelf, is really owing to the Soil. The Tree being planted in a good Earth, ſpreads out its Roots, and flouriſhes extreamly well, ſo long as they remain within the Compaſs of that Coat or Layer of the Ground; but when they have pierced through that, and got into ſome other ſtarving and poor Earth, they receive little Nouriſhment, and the Tree comes to a ſtand. It would continue ſo all along, were it not that the ſame Roots puſhing deeper and farther, find good Soil again. Thus in the preſent Inſtance, the good Soil holds the Roots twenty Years, and affording ſufficient Nouriſhment, the Tree all that while grows freely. At the End of that Time they penetrate into ſome unfavourable Layer; there they are kept twelve Years, all which Time the Tree barely lives, and hardly grows at all: till at the End of this Period the Roots piercing into another Bed of good Matter, ſupply the Tree as at firſt, and it then grows and increaſes again as it did from the Beginning.

It has been obſerv'd already, that the Oak will grow in any Soil, though it thrive differently according to the Nature of that Earth: but the Difference that is made by Soils in the Speedyneſs or Slowneſs of the Oak is not all: for the very Grain of the Wood is affected by it.

On barren Heaths, where the Bottom is ſtony, the Oak is ill-grain'd and coarſe: the Grain of that Oak which has been rais'd in ſandy Soils, is ſmoother and evener than any: but that which has been fed by a good firm Loam, inclining to clayey, is the right ſubſtantial and true grain'd Timber.

In the Foreſt of DEAN in GLOUCESTERSHIRE, there have been long ſince Iron Works, and a great deal of the Ground is cover'd with Slags of the Remains of thoſe old meltings. Theſe are taken up and wrought at preſent by the People who work the freſh Ore alſo, and that to a great Advantage. From thence has riſen an Opinion, that theſe Slags were filled with a freſh Quantity of Iron from the Air. But this is an Error. The Truth is, that the old Workmen did not ſo well know how to get all the Metal out of the Ore, as our People do at preſent; or that having great Choice and Plenty, they did not trouble themſelves to work near: however that be, 'tis certain that all the Iron now found in theſe Slags was left in them at that Time: the Occaſion of naming them here is, that from theſe Maſſes of Slags, Oaks grow in Abundance in that Foreſt, and to a great Value. A great Part of their Roots are ſpread among thoſe Slags, ſome piercing down below them, and others running through them to a better Ground that lies at a Diſtance: for the Roots of Trees ſpread farther than is imagin'd. In HAMPSHIRE, and other Places, Oaks are ſeen growing out of Stone Walls, and riſing to a great Height, and to the containing very conſiderable Quantities of Timber.

Though the Oak will grow any where, we ſee how it will be ſtop'd in its Growth by the Interpoſition of a Bed of unfavourable Matter in its Way. Theſe Things are not ſet down here for Curioſity, or to raiſe Mens Wonder, but for Uſe. As the Planter ſees an Oak may be thus ſtop'd for a Courſe of Time, ſo that it ſhall be as good at twenty as at two and thirty Years Growth, it will be worth his while to take all Precautions to prevent ſuch an Accident. We have directed the Uſe of an Auger for boring the Ground in Search of Marle, it will be adviſeable that the ſame Inſtrument be uſed in examining the Earth, where an Oak Plantation is deſign'd to be rais'd: and that the Planter may know to what a vaſt Size and Value Oaks will grow when the Soil favours them, not only in Condition, but Depth, we ſhall give him an Account of what Bigneſs ſome have ariſen to in ENGLAND, as ſupported by unqueſtionable Authority.

In WORKSOP Park the Duke of NORFOLK had an Oak which ſpread almoſt three Thouſand ſquare Yards. Near a Thouſand Horſe might ſtand under the Shade of it: this is affirm'd upon very good Authority, and will appear the more credible from other Inſtances of the vaſt Size of ſome of thoſe Trees. PLOT in his OXFORDSHIRE, tells us of an Oak at CLIFTON, that ſpread eighty one Foot from Bough End to Bough End, and ſhaded five hundred and ſixty ſquare Yards of Ground. 'Twas computed five and twenty hundred Men might ſtand ſheltered under it. The famous Robur Britanicum in Lord NORREY's Park at RICOT, was computed to be able to ſhelter between four and five Thouſand Men.

The Mainmaſt of the old Royal Sovereign was ninety nine Foot long, and near a Yard thick,

thick, all of one Piece of Oak; and ſome of the Beams of that Ship were made from another Oak near five Foot thick, and were forty Foot in Length.

What muſt be the Value of theſe Trees is very evident; and there is no Reaſon why any Man who will take the Pains in raiſing his Oaks from the Acorn upon the Spot with due Care, and ſee that the Soil be perfectly fit for the Growth, may not leave an Inheritance of ſuch to his Poſterity.

The Oak requires leſs lopping than any other Tree, whether it be intended for Beauty, or for Uſe. Nature rarely over-proportions the Branches to the Trunk; and they ſpread with great Beauty, and grow in Value with it. If there be any Danger of a Branch growing to an immoderate Extent, ſo as to rob the Trunk of its Nouriſhment, that is ſeen in the firſt Years; and Directions have been given already for the retrenching ſuch: for the reſt, the Oak does beſt when left to Nature; and, according to the beſt Accounts that can be had, the common Opinion of the Time of its Growth, Duration and Decay, ſpeaking in round Numbers, is not far from Truth. Oaks have been known to continue in a State of Growth and Increaſe ninety or a hundred Years; and we have Records of the planting of Oaks in ſome old Parks, that are of near three Hundred Years ſtanding, and now are in a miſerable State of Decay.

'Tis idle to ſuppoſe the exact Period is determin'd by theſe exact Numbers, but probably a Tree that attains its full Maturity ſo ſlowly, remains a long Time ſound, and is long in decaying; and this the Firmneſs of the Oak Wood makes it the more natural to imagine.

CHAP. XV.

Of the Felling of the Oak.

IF it be true that an Oak continues growing a Hundred Years, certainly 'tis beſt not to fell that Tree till after the full Period of the Growth, when it can conveniently be ſuffer'd to ſtand ſo long; but with a View of Advantage, it is idle to think of its ſtanding any longer: for certainly it can never be better than when at a full Maturity.

This then is, in general, the beſt Time of felling, but no particular Period can be limited for each Tree; for of thoſe raiſed from Acorns of the ſame Bough, and ſown in the ſame Soil, ſome will thrive better than others.

When a Quantity of Timber is to be felled, let it be firſt well examin'd, and let the Workmen begin with the decay'd Trees, if there be any, leaving the beſt and moſt flouriſhing till the laſt, becauſe they can get no Damage in ſtanding a little longer; and the others which have begun to decay, will be periſhing every Day more and more.

More Things enter into the Conſideration in the Article of felling the Oak than any other Timber; as the ſeparating of the Bark for the Tanners, and the like. The beſt Seaſon is the latter End of April, which favours the Separation of the Bark; it then riſing freely and eaſily.

At this Seaſon the Trees being mark'd out that are to be felled, the firſt Thing to be done is to cut off ſuch Arms as may damage the Trunk in the fall. The Manner of doing this is, by beginning below cloſe to the Trunk: when they have thus cut the Arm about a ſixth Part through, they begin at the Top near the Trunk alſo, and when they come near meeting the other cutting, the Arm falls off without ſpliting.

When the Branches that may be hurtful in the Fall are thus removed, they are to go to work upon the Trunk, cutting it down as near as poſſible to the Ground, becauſe the Length of the Timber is a very great Article in its Value, beſide the adding to its Quantity.

When the Oak is down, its Trunk is to be ſtrip'd of the Bark, which will come off freely at this Seaſon, becauſe the Sap is full and flowing; as the Bark is taken off, ſet it up in ſuch a Manner as it may dry beſt. After this take off the Bark from the Branches that were left on; and ſet it up in like Manner: when this is done, let the Branches be cut off; and then cut it into Lengths for Sale.

It is a Cuſtom in many Places to take off the Barks of Oak Trees as they are ſtanding, a Year or more before they are felled. This is done to give a Strength and Firmneſs to the Timber, and is called in thoſe Places a ſeaſoning of it: but notwithſtanding what has been ſaid in favour of this Practice, I have never been able to find from the Accounts of thoſe who have try'd, that it is of any Uſe.

CHAP. XVI.

Of the ſeaſoning Oak, and judging of the Timber.

THE Wood being thus felled and cut out, the next Conſideration is the ſeaſoning of it, which is done ſeveral Ways; but all of them require Time. Green Oak is fit for very few Purpoſes; and a great deal of its Value in many Caſes depends upon the ſeaſoning.

The plaineſt and moſt familiar Method is to truſt to Time only, taking Care to prevent Accidents in the mean while. Thus let the Timber, cut as before directed, be laid up till dry in a careful Manner. Let it be taken off the Ground at a dry Time, and laid up in an airy Place, but out of the Reach of the Sun, and defended from the Winds, both which crack it in the drying. Let Blocks be put between the ſeveral Pieces, to give Paſſage to the Air. If this be omitted, they grow moiſt and mouldy, or breed Toadſtools. In this Manner Time will take a proper Effect, the Timber will ſhrink gradually and regularly, and being thus ſeaſon'd, it will ſtand when it is employ'd in Building, or on other Occaſions.

Another Way of ſeaſoning Oak Timber is by burying it for ſome Time under Ground: but this

this muſt be done in a dry Soil, otherwiſe it will require more ſeaſoning when it comes out than it did when it was put in.

The beſt Method of all for many Purpoſes, and particularly thoſe which require the beſt ſeaſon'd Timber, is that we learn'd of the Venetians, which is called the Water ſeaſoning. This is done by ſinking the Timber under Water; and no Way is ſo good to prevent its ſpliting. The Venetians from whom we learn'd this, keep the Timber for their Sea Service two or three Years under Water before they uſe it, and then it ſtands firmly.

The Water ſeaſoning is commonly done in England in this Manner. When the Oak is cut into Boards, or Pieces, they ſink it under River Water for fourteen or fifteen Days. Then they take it out, and lay it up carefully to dry in a cool airy Place, as directed in piling up the freſh Timber; preſerving it from Winds and Sun, but leaving the Air free Paſſage amongſt it.

Oak that is cleft is not ſo apt to ſplit and crack as ſuch as is entire: and round Pieces are always more ready to crack than ſuch as are ſquared. Theſe are ſtanding Rules, and the Workman is to conduct himſelf in his Choice accordingly: Pieces that are bored through are found ſeldom to ſplit. In general the more the Oak is in its natural Condition, the more liable it is to ſplit; and the more it has been cut and wrought, the leſs.

Burning the Ends of Poſts of Oak that are to be let into the Ground, has been accounted an excellent Method to preſerve them a long Time; and ſome have carried this Practice ſo far, as to burn the Ends ſo deep as to impair their Strength. It is at preſent much diſputed by thoſe who pretend Experience on their Side, whether this Practice be of any Uſe at all. If not, 'tis a great deal of Trouble thrown away.

This burning naturally preſerves that Part of the Poſt from the Worms by which it is ſubject to be gnaw'd under Ground; and the Dutch to prevent the ſame Accident under Water, cover over their Piles and Ship Bottoms with Pitch and Tar; on which they ſprinkle Sea Sand with Powder of Sea Shells among it, and Flakes of Iron, ſuch as fly off in the hammering.

In the Choice of Oak Timber, the Purchaſer ſhould examine the Weight and the Grain, the heavieſt Timber in this Kind is always the beſt for Purpoſes that require great Strength and Soundneſs; and the ſmoother and evener the Grain, the better for moſt Occaſions. Oak is not to be truſted in any nice Works, till it has been well ſeaſon'd: and that from full grown Trees, is preferable to ſuch as has been cut from ſmaller. But when the Tree has ſtood beyond its Time, the Wood becomes ſomewhat brittle; this is the firſt Tendency in Oak to decay.

CHAP. XVII.

Of judging of Oak as it ſtands.

THIS is an Article of great Conſequence very frequently, and nothing is ſo difficult: it is a common Thing to purchaſe Trees ſtanding; and in Oak 'tis of great Importance to be able to gueſs at their Value. Where all is good, nothing would be ſo eaſy, for the Queſtion might be anſwer'd by meaſuring, inſtead of gueſſing, but nothing is ſo capable of deceiveing as a Tree while it ſtands. There may be many Infirmities which 'tis impoſſible to diſcover till it is down; and which then greatly leſſen the Value. Such as may be diſcover'd we ſhall point out; as alſo the Signs of Decay.

In the firſt Place, if the Head of the Tree be in any Part dead, 'tis a ſhrewd Sign that there are more Faults in the Body: in this Caſe it is a very good Method to bore into the Trunk with a ſmall Piercer made Auger Faſhion, and obſerve the Condition of what it draws out.

If in any Tree there be a ſwelling Vein perceiv'd riſing above the Level of the reſt of the Tree, and cover'd by the Bark, it is a Sign all is not well within. When this Vein twiſts about in the Manner of a Stalk of Ivy, it is worſt of all; and ſeldom is ſeen but where the Heart of the Trunk is rotten.

Finally, another very good Method of judging is, to open the Earth about the Roots; and examine in what Condition they appear. If they are freſh, ſound, and full of Juice; it is a Sign all is well above: but on the contrary, when many of them are found decay'd without any viſible Cauſe in the Ground; when ſome of them are rotten, brittle and mouldy, all is wrong in the Body of the Tree. This is a Part not ſo much attended to, but a Decay here is a more fatal Sign than the Deadneſs of a Part of the Head.

Upon the whole, a great deal is to be judg'd by the general Aſpect, and that much more by thoſe who are accuſtom'd to theſe Things than by Strangers. There is a Look of Health in a Tree that is perfectly well and ſound, which no other perfectly has. And tho' People who ſhould be Judges are often deceived, yet it is their want of Obſervation, or their want of Knowledge that often leads them to it. There will be Faults which no Perſon whatſoever can diſcover till they are ſeen in cutting through the Tree; but the greater Part of thoſe which debaſe the Value, are not of this Kind: they may be gueſs'd at leaſt, if not certainly known, from ſome one or another of theſe Marks on a careful Inſpection.

CHAP.

CHAP. XVIII.

Of the Elm; its Kinds, and proper Soil and Situation.

NEXT to the Oak the Elm is the moſt univerſal of the English Timber Trees. It is of all Trees the moſt common in many Parts of the Kingdom in Hedge Rows; and is thence the moſt familiar to the Eye of all the Kinds.

The Elm is not a Tree remarkable either for Flowers or Fruit. Both are inconſiderable. The firſt ſcarce at all regarded; and the other rarely minded, unleſs where fallen in Heaps under the Tree. The Flower is little and hollow, with ſome Threads in the middle; and the Fruit which comes after it is a flat leafy Caſe, having in the middle a longiſh Seed Veſſel, ſomewhat like a Pear in Shape, with one Seed.

We have no leſs than five Kinds of Elm common in one or other of our Plantations. Some in Hedge Rows, others in Coppices; and ſome in Avenues and Plantations intended for Ornament. It is of great Importance to the Planter, who conſiders theſe Things with regard to the Profits that may ariſe from them, to have a perfect Knowledge of theſe Diſtinctions; and to chuſe the proper Kinds according to his ſeveral Occaſions. One being preferable on ſome, and others on the others.

The five Kinds of Elm are theſe. 1. The common Elm. This is a tall well growing Tree, with broad rough Leaves. 2. The narrow leav'd Elm; this has ſmall and narrow Leaves, and is called by ſome by way of Diſtinction, the English Elm. 3. The Dutch Elm; this has broader Leaves than the common Elm, and as rough as they. 4. The Witch Elm; which has very ſmall and broad Leaves: and, fifthly, the broadeſt leav'd Kind of all, which is called the Witch Hazel.

All theſe ſucceed extreamly well in our Plantations, but it does not appear from the earlieſt Accounts that any one of them is a Native of the Kingdom. Some of them are taken into Gardens for Hedges; and the Nurſery Men who ſpoil many a handſome Tree for Curioſity, have found the Way to get them with yellow and white, variegated, or as they call them, ſtriped Leaves.

The common Elm, the narrow leav'd Elm, and Dutch Elm, are beſt for ordinary Plantations; the two others, namely, the witch Elm, and witch Hazel, do beſt in Woods. Theſe two grow very well among other Trees; but the other Kinds, though they ſucceed extreamly well elſewhere, and will bear to be planted in Rows very near one another, do not thrive in Woods.

This is a ſingular Obſervation, but it is not difficult to be explain'd. The Elm, when intended for long Growth, muſt have free Air, and a large Scope for its Roots where there is Plenty of Nouriſhment. For this Reaſon ſeveral Elms ſtanding very cloſe to one another thrive, becauſe they are yet open to the free Paſſage of the Air from each Side, which they are not when choaked up every Way in Woods: and their Roots here can ſpread to a Diſtance under the Turf, and find Nouriſhment in Abundance, which they cannot do in Woods, where every Inch of the Ground is full of Roots of other Trees.

The Elm is very hardy, and full of Life: but it requires a great deal of Nouriſhment; ſcarce any Tree more. It will ſend out its Roots a vaſt Way to ſearch for it, but then it muſt be ſupplied in Plenty in thoſe Places. Thus it is ſupplied where other Trees are not planted about it, but not where they are. This is the ſole Reaſon why the Elm ſucceeds excellently in Hedge Rows and Avenues, but not at all among the other Trees of a Wood. Far from hurting one another by being planted cloſe in Avenues or Hedges, they are found to thrive the better: for they thus defend one another from Winds, and are obſerv'd to grow ſtraiter and taller in theſe Places, than where they ſtand ſingle.

Though the Elm will grow any where, yet it requires a good Soil and Situation to thrive. When too much expos'd, as upon hilly Lands, it does not proſper any Thing nearly as in lower Grounds, neither will it ſucceed to the Planters Wiſhes in a hot dry Soil. It will live in ſandy or gravelly Grounds, but he knows little of his own Intereſt who plants it there. In ſome Places the Elm has been obſerv'd to grow very poorly, though the Soil was good, but there has been a bad Bottom.

The Soil the Elm loves, and in which it proſpers to the utmoſt, is good rich Mould; and the Situation that moſt favours it, is a level and ſomewhat low Ground, for it loves Moiſture. In the Hedge Rows of ſuch Lands Elms will yield a vaſt Advantage. They will often grow very well under the Advantage of that Situation, even where the Soil is not ſuch as beſt ſuits with them. The Huſbandman may know by the Growth of his Neighbours Elms, whether they be a proper Plantation for his own Grounds; for where they grow tall and ſtrait, they alſo grow quick; and, on the contrary, where they are low, ſtubbed, and ill-ſhap'd, they grow ſlow: this is his great Conſideration. For in one Place he will have good Timber in a little Time, and in the other, he will, after a great while, have much leſs in Quantity, and that from its ill Growth alſo, leſs Value.

Let him therefore plant Elms only in favourable Soils, and good Situations; in Places not expos'd, in light Earth, and where there is Moiſture. There are Trees enough for his hilly Places, and dry Soils, as will be ſeen hereafter; for in ſuch the Elm will never thrive as in others.

In Choice of the Kind, let him prefer the English Elm, either of the broad or narrow leav'd Kind to the Dutch. In this I ſhall ſeem particular, contradicting the vulgar Practice. It is ſuppoſed the Dutch Elm thrives quicker, but this is an Error. For the ten or dozen firſt Years the Dutch Elm will out-grow the English, but that is all. I have ſeen two planted together of equal Size, and equally thriving Trees: for ten or twelve Years the Dutch has thus out-grown the English; but after that it grows more ſlowly; and, on the contrary,

contrary, the ENGLISH more quick: by eighteen Years old the ENGLISH Elm had greatly the better of the DUTCH; and at this Time 1748, both being of three and twenty Years Growth, the ENGLISH Elm exceeds it by a vaſt deal.

The Planter may here take this Leſſon, that if at any Time he have a Mind to cut the Elm while ſmall, the DUTCH is beſt, but this is not the common Deſign. When rais'd for Timber, the ENGLISH has the Preference: and there is another great Difference, the Timber of the ENGLISH Elm is much better.

If any one is determined to have the larger Elm in Coppices, though I have already obſerved the witch Elm and witch Hazel are fitteſt for that Uſe, he muſt plant them only at the Edges of the Piece, for they will not do in the Middle; and for this Purpoſe the DUTCH Elm is better than the ENGLISH, for the Reaſon given already; which is, that in twelve or fourteen Years, the common Time of Growth of a Coppice Plantation, it will be larger than an ENGLISH one.

The ENGLISH Elms are altogether to be prefer'd for Timber Trees, and of the two Kinds of them the careful Planter is to chuſe the broad leaved for the richer and moiſter Soils, and the narrow leaved Kind for the dryer and poorer. If he will plant Elms in his hilly Hedge Rows, the narrow leav'd Sort will grow better than the other. For Parks and Avenues the broad leav'd Elm is to be prefer'd, becauſe it is the more beautiful, and naturally the more regularly growing Tree.

CHAP. XIX.

Of the Propagation of the Elm.

THE Propagation of the Elm is exceedingly eaſy, for it may be rais'd any Way that any other Tree whatſoever can. It will grow from freſh Poles of it ſtuck into the Earth, at a proper Seaſon, in the Manner of the Willow; and may be rais'd in great Abundance, by burying a large Piece of a freſh Branch in the Ground, at a proper Time of the Year, and in a good Place.

It may be rais'd in the Nurſery either from Seed or by Suckers, and it bears tranſplanting perfectly well; ſo that the Planter may take his Choice of any of the following Ways.

If he uſe a Nurſery let it be on a Piece of even Ground well fenc'd; and order'd as before directed. Many ſay the Elm bears no Seed, and ſome have written ſo, but that is a ſtrange Error. Whoever walks in an Avenue of well-grown and thriving Elms in APRIL, will find the Ground cover'd with the Seeds of the Trees, in thoſe thin leafy Caſes I have deſcribed as holding them. To get his Seed let him mark out a very well-growing Tree, and watch the falling of theſe Parts. Let a Quantity of them be gathered, and directly ſown in the Nurſery in Rows, at a ſmall Diſtance and very ſhallow, the Earth being only juſt raked over them.

They will ſhoot in great Abundance; and are after a little Time to be thinn'd: the Ground is then be kept clear from Weeds; and at two Years Growth they are to be removed into another Part of the Nurſery, planting them at two Foot Diſtance, in Rows four Foot aſunder: and here they are to be kept till they are of ſix or eight Years Growth, at which Time they will be fit to tranſplant into the Places where they are to remain.

The Nurſery muſt be, all this Time, kept clear from Weeds, and the Ground dug every Spring between the Rows, which will greatly aſſiſt their Growth: and from Time to Time they are to be prun'd up, cutting off all the large ſtraggling Branches, that would hinder their upright Growth; in which both the Beauty and Value of an Elm conſiſt. The Elm is, while young, to be prun'd much cloſer than the Oak; but even this is not to be wholly deprived of its Shoots; for a young naked Trunk, with only a Twig at the Head, will never riſe to be a fine Tree. Some ſmall Shoots muſt be left on, otherwiſe the Sap all runs up, none ſtaying to encreaſe the Trunk, and the ſmall Top that it has left is too heavy for the Support of its weak Stem: this bows down therefore, and the Tree will grow for ever crooked.

The common Way of raiſing the Elm is from Sets, which grow in vaſt Abundance from the Roots of the old Trees in Hedge Rows, where the Soil is favourable. Poor People take theſe up in many Places, and ſell them to the Nurſery-men, who thence raiſe young Elms for Sale. The beſt Time of removing theſe Suckers is toward the End of OCTOBER; but the Trees thus rais'd are ſeldom ſo good. The Way from Seed is very eaſy. And the Plants ſown in Spring will be up by the Beginning of AUGUST, and will ſtand the Winter of themſelves, though if a little looſe Straw, or other ſuch Matter, be ſcattered over them by Way of Defence, they will ſucceed the better.

Thoſe who would raiſe Elms from Stakes ſhould cut them about ſix Foot long, and of the Thickneſs of a Child's Wriſt, ſtriking them off at the Bottom by one ſlanting Stroke. Theſe being ſtuck down in a moiſt and mellow Earth in Spring, will ſhoot very vigorouſly, but irregularly. This is to be done early in the Seaſon, and in a rich and ſomewhat damp Soil.

In like Manner thoſe who raiſe Elms by burying the Branches, or larger Boughs, or the Trunk of ſome ſmall Tree, muſt chuſe a good Earth, where there is ſome Moiſture, and the Spring Seaſon. In this Earth they are to dig Trenches of a Foot deep, and to lay in them a Piece of ſix, eight, or ten Foot long, of a large Bough, or of the ſmall Trunk of an Elm. They are to cover this up with the Earth taken out of the Trench, and watering it once or twice leave it to Nature. There will riſe many young Shoots in a few Months, from every Part of the buried Wood. But theſe are Methods to be uſed only to ſuit particular Purpoſes.

Thoſe who would ſpare the Trouble of ſowing the Elm, by taking up wild Suckers, had better do this themſelves, than purchaſe them of others; and better prepare for the getting them than take them as they happen to riſe.

The Way to prepare for them is this. Lay bare ſome of the large Roots of a tall and thrive-

ing Elm, and chop them with an Axe one fourth Part through in ſeveral Places. Put a little Piece of Wood by way of Wedge, or a ſmall Stone, into every Nick, thus made with the Axe, and then cover the Roots up again with Mould about three Inches thick. There will riſe from each of theſe Nicks a great Number of Suckers, which at two or three Years Growth may be taken off and tranſplanted.

Another Way of obtaining Suckers in Plenty is this. Dig a ſtrait Trench at ſome Diſtance from an Elm, and the Roots having been wounded by this, and being laid bare will ſend up a vaſt Quantity of Suckers. Theſe are to be cut off from the old Roots, and tranſplanted at two Years Growth, and they ſeldom fail to produce good Trees.

We have mentioned theſe ſeveral Methods of propagating the Elm, to ſhew how eaſy it is to raiſe a Supply for Plantation: but there remains yet one other Way to be nam'd, that is, by Layers; for, to go regularly to work, the Way is to raiſe the young Elms either from Seed or by this Way; they being, by one or other of theſe Methods, more certain of Growth when tranſplanted, and of being ſtrait and well-bodied Trees than any other. To raiſe a Supply of Elms by Layers, the regular and certain Method is this.

Let a ſmall Piece of Ground be dreſs'd carefully for receiving the Roots and Stumps of ſome Elms, which are to furniſh Shoots for Layers: theſe Roots, with their Stumps, are called the Stools.

The Soil of this Piece of Ground ſhould be light, but with ſome Degree of Moiſture; and it ſhould be trench'd, and a little well rotted Dung buried in it. When this Ground has been clear'd from all Roots of Weeds, and laid level, the Plants muſt be let into it at about eight Foot Diſtance. The Seaſon for this is Autumn, and being a little watered, and the Ground dug now and then about them, they will, the next Spring, make a great many vigorous Shoots.

Theſe Shoots are to be laid, and the proper Time for that is when they are of about two Years Growth.

At this Age, in the Middle of February, they are to be laid in this Manner. Each Shoot is to be ſlit a little Way, and then buried under the Mould. Five or ſix Inches Depth of Earth is to be laid over the Shoot; and its Top is to riſe a Foot out of the Ground.

When all the Shoots are laid the whole Stool is to be well watered: and this is to be repeated at Times when it ſhall appear moſt neceſſary, during the Summer; and by this Means, the Elm being a very lively and vigorous Tree, theſe Shoots will all have taken Root by the following Autumn, at which Time, when the Leaves are fallen, they are to be taken off and planted in the Nurſery, at a Foot and half Diſtance, in Rows three Foot aſunder; where they may ſtand till they are of a Size to remove into the proper Places.

This is the whole Trouble of that Practice, call'd by the Gardiners and Nurſery-men, laying; and it is idle for any one who intends to plant many Elms, not to do it for himſelf: a few Stools thus planted will yield, every Year, a great Number of young Elms, with ſcarce any Trouble.

If at any Time a Shoot will not lie readily, it is to be pegg'd down with a wooden Hook or two.

Inſtead of ſlitting the Shoot ſome twiſt it; and in other Caſes a Wire is tied tight round it, and Holes pierc'd through and through with an Awl; or the Shoot is lightly cut round. Any of theſe Methods will do, for all that is needful is to give the Shoot a Tendency to puſh out a Root at the Place where it is laid: and when that is done, and the Roots have ſome Strength, it is to be cut off from the Stool, and tranſplanted into the Nurſery, to arrive there at the proper Growth for its laſt Removal.

Though early in the Spring be the beſt Seaſon for laying the Elm Shoots, it may be done with Succeſs in Autumn: and although Spring is preferable for the Elm and other very vigorous and quick-ſhooting Trees, yet for others the End of October is better; becauſe they have then the whole Winter to prepare for rooting, before they are called on by the Warmth of Spring to ſhoot out Leaves and Branches.

That there is ſome Sap riſing all the Time from October to the March following, which is the Seaſon when the Spring Shoots are preparing, is plain from this, that there is a continual Waſte of Sap from the live Branches of Trees at that Time: for if they be cut off, and the cut End ſeal'd up, that no Moiſture gets out there, ſtill there will be a large Quantity, conſidering the Seaſon, evaporated; and the Branches will grow dry and loſe their Weight. Doubtleſs the ſame happens while they are on the Tree, as is thus found when cut off, and there muſt be a Supply for this from the Root.

Now as it is plain there is ſome Sap ſent into the Shoots at this Seaſon, and that it does not force out Buds or Leaves, nothing is more natural than that it ſhould ſpend itſelf in ſending little Roots from the wounded Part of the Shoot, which is quiet and warm under Ground.

This is a ſubſtantial Reaſon for laying many Trees in Autumn; but for ſuch as the Elm that thrives ſo freely, and will ſend out Roots at any Time, the Spring is early enough. I have named the different Seaſons, and explained the Reaſon here for the Sake of the Huſbandman's general Knowledge. Such Trees as do not root freely in the Layers, may be beſt laid in October; the others in Spring.

Having thus once delivered, at large, the Method of raiſing a Tree by Layers, it will be underſtood when only mentioned on ſucceeding Occaſions. It has been judg'd right therefore to be the longer in theſe firſt Chapters upon the Propagation of Foreſt Trees, that we may be the ſhorter on others.

Some have pretended to deny the Riſe of any Sap in Winter: and theſe might very well object to the laying Trees in Autumn; for if no Sap roſe they would be in the Condition of dead Sticks at that Time, and their buried Part would be in Danger of rotting. But the contrary moſt evidently appears. It is found by Trial that the Holm Oak, and the Cedar of Lebanon will grow by grafting on the common Oak, and on

the Larch Tree. And although the Oak drops its Leaves in Autumn, the Holm Oak grafted on it keeps green all Winter; and juſt the ſame happens in the other Caſe; for though the Larch Tree drops its Leaves in Autumn, the Cedar being an ever-green like the Holm Oak, keeps its Leaves when grafted on it. It is very plain therefore, that ſome Sap ariſes from the Oak, and the Larch Tree all Winter, otherwiſe theſe Grafts could not keep their Leaves; for they could not keep them without Sap, and they have no other Supply. Leſs Sap ſatisfies Ever-greens, becauſe they evaporate leſs, but ſtill it is plain there muſt be ſome.

We would have the Farmer underſtand every Thing he is adviſed to practiſe. And with that Deſign this Matter is ſo carefully explain'd to him. He ſees plainly that ſome Sap riſes in all Trees in Winter: therefore when we ſhall on any future Occaſion direct the raiſing a Tree from Layers; and order it to be done in October, let him not ſuppoſe it an Error, or a careleſs Direction; for there are many that will ſucceed beſt that Way, though the Elm does better in Spring.

The Huſbandman has here before him the ſeveral Methods by which the Elm may be propagated. But of all theſe the two which are preferable, are from Seed or by Layers; and in his Choice between theſe, he is to be determin'd from his own particular Circumſtances and Deſigns. If he intend a Plantation of Elms to be made at once, and ſhall not think of repeating that Work, the beſt Way is raiſing them from Seed: but if he intend to continue from time to time planting, he is to prefer that by Layers. For the Seedlings are a Stock for once; but the Stools for laying being once prepared, will afford a freſh Supply every Year for his Life.

If the Farmer at any Time want to ſet a few Elms only, it is not needful he ſhould be at the Trouble of either of theſe Methods: but his beſt Way will be to take up Suckers from the Hedge Rows, chuſing the ſtraiteſt and moſt promiſing.

CHAP. XX.

Of the Uſes of the Elm in Plantations.

THE Elm is a valuable and uſeful Tree, both for the Field and Garden: and none is more to be eſteem'd for Plantations, where the Eye is to be pleaſed, as well as the Eſtate improved by them.

No Tree is ſo good as the Elm for Avenues and Walks, becauſe, with proper Care, none grows ſo upright and regular; and none will, in ſo ſhort a Time, reach ſo conſiderable a Height.

No Tree is better for Hedge Rows, when the Soil and Situation are ſuited: for by its upright and regular Growth, it is an Ornament to an Eſtate; and its Branches not ſpreading too wide, eſpecially in the uſual Way of lopping in Hedge Rows, it does not ſhade too much of the Crop in the Field; and yet it is leafy, and affords a ſufficient Shade for Cattle.

In Parks alſo, the Elm makes a very beautiful Appearance in Clumps, or ſingly: but for this Purpoſe 'tis beſt not to lop it up ſo cloſe, but to leave ſome large Branches; or from twenty Foot upwards to ſuffer it to ſpread as Nature pleaſes. In this Way Elms will ſtand many Years, and look very beautiful, but they are apt to grow hollow: the Verdure will often keep freſh when the whole Heart of the Tree is gone; nay, when nothing remains but a Shell of Bark. But this is not wonderful, for the Bark conveys up the Sap.

The young Shoots of the Elm are a very acceptable Food for Cattle; and they may often be cut for this Purpoſe to the great Profit of the Farmer, when other Fodder is expenſive.

The Loppings are very good Wood for Fuel; and an excellent Kind of Charcoal is made of the Branches.

Theſe are the ordinary Uſes of the Elm in the Field, excluſive of its Timber. About Houſes it is valuable becauſe it is very pliant; and may be made to grow any Way.

It is excellent to plant by way of Defence from Winds. For, if left to ſpread its own Way, its growing cloſe, and its great Number of Branches, are an excellent Shelter; but if cut and train'd up, it may be raiſed into a Hedge of forty Foot or more in Height, and of ſuch a Compactneſs, as to keep off every Blaſt from the Dwelling.

But Caution muſt be taken that Elms be not for this Purpoſe planted too near the Garden, for they will rob the Fruit Trees of their Nouriſhment, and ſpoil the Beauty of both Graſs and Gravel. No Tree ſpreads its Roots ſo wide as the Elm, and theſe will therefore interfere with thoſe of the Wall Trees, and deprive them of their Nouriſhment; and as no Tree in the World is ſo apt to ſend up its Suckers from the Roots, theſe will riſe every where among the Graſs, and through the Gravel, being an eternal Plague to the Gardiner, and continually defacing the Beauty of the Walks.

A vaſt Advantage of the Elm about Houſes, is alſo that it may be tranſplanted when very large; no Tree bearing this ſo well. But let the Planter in that Way receive this Advice, always to get his large Trees from a Nurſery; becauſe having been there prepared for tranſplanting, they will riſe with a good Root; whereas thoſe from Hedge Rows often fail when taken up at any Size from the Irregularity of the ſpreading.

In this Place alſo, it may be proper to inſert the neceſſary Cautions about removing thoſe Trees for the laſt Time, or to the Places where they are finally to ſtand. Now, on this Occaſion, whether they be very large, or of the common planting Size, which is at ſeven or eight Years Growth: this muſt be done in the Beginning of October; their Heads muſt be leſſen'd, but the leading Shoot muſt not be taken off; nor muſt the other Branches be cut too cloſe. Their Roots muſt not be buried too deep; and eſpecially if the Soil be moiſt. It is better in this Caſe to plant them ſhallow, and raiſe a Bank or Hill about them. When this is done, they are to be ſtaked as directed for the

Oak,

Oak, and by these Means there will scarce ever a single Tree fail either in the Garden or Field.

The best Season for lopping the Elm is about the Middle of January; and the oftener this is repeated, the taller the Tree will grow. The Side Boughs are to be cut off freely in these Loppings, but the Tops must be spared: when they are cut too near, they frequently let in Wet, to the Destruction of the Tree. In Spain they have Plantations of Elms many Leagues in Length, which are kept constantly and frequently lopped, and by their even Trunk, great Height and bushy Tops, make a noble Appearance.

CHAP. XXI.

Of the Value of the Elm in Timber.

WE have consider'd the Elm in a Variety of Uses while standing, we are now to examine into its Nature and Value as Timber.

The best Season for felling the Timber Elm is in the Beginning of December. No Tree is so vigorous as this; and therefore the fit Season for cutting it down is to be consider'd in a particular Manner; for to give the greatest Value to the Timber, the Sap must be as much as possible at rest when it is cut: and this is the Season when it is in that State.

As to the Kinds of Elm for Timber, we have observ'd already, that the English Elm is better than the Dutch, for the Wood is sounder. Of the two common English Kinds rais'd for Timber, the Difference is this, the broad leav'd Elm affords an evener grain'd Plank; but the Timber of the narrow leav'd Kind is harder.

Though these are the only two we usually raise for Size, we need not be ty'd down to them, for the witch Elm, which we commonly confine to the Coppice, will afford an excellent Timber: this is not at all inferior to that of the common Elm, and is of the smooth grain'd Sort, or more like that of the broad, than the narrow leav'd Kind.

The witch Elm requires the dampest Soil of any of the Kinds; but in such Ground it will out-grow the common Elm. It is this Quickness of Growth that has given it the Preference above the other for a Coppice Shrub. But it will in such Plantation rise to an excellent Tree, fully equalling the Elm in Bigness, and in Value.

The Planter will do well to consider this, and to raise Supplies of this as well as the other Kinds, and to set it always in the dampest Places where his Elms are to stand. For this Purpose he should sow the Seeds of each Kind; and dispose them properly, which will vastly increase his Profits; or if he raise them from Layers, he should have two or three Stools of each Sort; so that he may take off his Layers from Kinds fitted to the Soil, which can never be done if he buys them.

The Elm Timber is an exceeding strong and sound Wood; and it is very durable either in Places where it is kept always wet, or where it is always dry: but it does not bear sudden Changes from one Condition to the other. It endures a vast while in Water Pipes, which are always wet and under Ground, and in many of the common Uses where it is never wetted at all, 'tis in a Manner everlasting. Its Toughness recommends it to the Wheelrights and Millrights: and it is very useful for Dressers and chopping Blocks, because it will not break away in Chips.

There is a vast Difference between Elm Timber cut in the Middle of Winter, and that at other less favourable Times. The Trees are in felling to be cut off as close as possible to the Ground; and Care must be taken about the Fall, that they are not hurt by their own Boughs, or Things in their Way, for they come down with a great Weight by reason of their Tallness.

It is made by some a great Objection to the Elm, that it is apt, as before observ'd, to be hollow: but this may in a great Measure be prevented, by observing the Directions already laid down, in the Articles of the last Removal and the Lopping. Twenty Elms become hollow by bad Management, for one that is so from Nature. The common Occasion of it is, the cutting the leading Shoot; or some upright Branch of the Head; or some nearly upright Branch elsewhere: these let in the Wet at the Wound, and the Decay which begins there, runs down to the Bottom of the Tree.

When a Branch has thus injudiciously been taken off, which endangers the Tree, the Method to prevent that Mischief is to cut it off again close to the Trunk, and cover the Wound with Lead, or Oil Cloth.

As the Elm so ill bears cutting off its upright Branches, it does but very badly take the topping for a Pollard. 'Tis indeed one of the worst Trees for this Use: but some will cut it in that Manner. In this Case many die in the Operation; and the rest, though they seem to bear it at first, commonly grow hollow afterwards, and decay entirely.

When the Farmer intends to use the Shoots and Branches of the Elm as Fodder for his Cattle, he should cut them about August, and let the Leaves dry on them. These will keep till Winter, and the Cattle will eat them rather than almost any other Food, and thrive upon them extreamly. Hogs will eat them green, and fatten upon them very quickly.

People who are fond of relating strange Stories, have asserted that Elms will grow from Chips of the dry Wood. This is not true, but what gave rise to it is a very familiar Observation. Elms are often removed soon after they are felled; and sometimes when they have shot out from the Knots, as they will do as they lie on the Ground. When these are squared for Use, those knotty Parts being trodden into the Ground by the Workmen, will shoot; but the rest of the Story is not true.

The common broad leav'd Elm in a rich and somewhat moist Soil, will grow to a great Bigness. There have been seen whole Rows of them in Hedges, that were three Foot square for forty Foot in Height; and there are authentick and unquestionable Accounts of an Elm in

Oxfordshire, which near the Ground was ſix Yards in Diameter. Dr. Plot who gives us this Account, mentions a witch Elm very nearly of the ſame Bigneſs: he ſays it was at the lower End ſeventeen Yards in Circumference, forty Yards high, and contain'd near a Hundred Ton of Timber.

The Elm is not ſo tedious in its Growth as the Oak, and the Demand for its Timber is very conſiderable, though the Price be but moderate: the Quantity uſed for Water Pipes alone is ſurprizing. There is therefore great Encouragement for the Huſbandman to plant it. 'Tis eaſily done, the Expence almoſt nothing: the Ground it takes up in Hedge Rows in the ſame Manner nearly nothing, and it grows quick, and may be cut down at any Bigneſs to conſiderable Profit.

CHAP. XXII.

Of the Aſh, its proper Soil and Situation.

THE Aſh is a tall and ſtout Tree when ſuffer'd to grow freely. Its Leaves are every one compoſed of ſeveral ſmaller, which ſtand on each Side a Stalk with an odd one at the End. The Flowers are ſmall and inconſiderable. They conſiſt only of a few ſhort Threads. The Fruit grows in other Parts of the Tree, is what we call the Aſh Key, hanging in Bunches.

Though we have ſeveral Kinds of the Elm, there is but one Sort of Aſh wild in England, or fit to be cultivated in Hedges or other Plantations for its Timber. The Gardiners have found the Way to ſtain its Leaves, and then call it the variegated Aſh. The flowering Aſh, and ſome other Kinds, are alſo kept there for Beauty; but with theſe the Huſbandman has nothing to do. There is one from New England with ſharp pointed Leaves, and another from Carolina with broad Keys. The Italian Aſh which affords Manna, is alſo diſtinguiſh'd by having rounder Leaves; but with theſe he whoſe Intent is to raiſe Timber has no Concern; the common English Aſh is his only Kind.

The natural and favourite Soil of the Aſh is, a light and rich Mould, but it will grow any where: we find it in ſandy Ground thriving very tolerably, and alſo on rocky and ſtony; but when it has its own natural Earth about it, the Growth is much quicker. In a good Soil there is ſcarce any Tree that will in leſs Time riſe to ſo conſiderable Value. A Hundred Years is allowed for the Growth of the Oak. The Aſh, on the contrary, will riſe to its utmoſt Perfection in between forty and fifty, when it has been carefully manag'd at firſt, and the Soil ſuits its Growth.

We ſee Aſhes on the moſt barren Mountains, and it is fit the Huſbandman ſhould know they will live on ſuch Places; but they do not thrive there either ſo quickly, or ſo regularly as in better Ground. In general the Planter ſhould be inform'd that it may be proper for him to plant the Aſh on any Soil, and in any Situation, but that he muſt make a right Uſe of it when planted. The Aſh on barren hilly Places, will grow to a very good Coppice Wood; but 'tis not a fit Soil for planting it for large Growth. And in the moſt ſtony Ground, the Aſh may be planted for Pollard, and will yield a good Quantity of Wood in Shrowdings, as well as maintain a firm Trunk to the Height, that is allow'd on thoſe Occaſions: but it is only in the richer Soils, and in more favourable Situations, that it will grow ſpeedily and profitably for Service as Timber.

One Kind of Soil has often been remark'd as favourable to the Growth of the Aſh, which it is a Wonder the Huſbandman has not more obſerv'd, or oftener planted with it, this is the white chalky Soil: many Trees that flouriſh very well on others, will grow but poorly on this; whereas the Aſh, whenever it is ſeen on ſuch a Soil, has a healthy Aſpect; and Experience ſhews thoſe who are concern'd, that it arrives very quick at a valuable Size.

We have adviſed the Huſbandman before, always to look into the Hedge Rows of his Neighbours, before he plants Trees in his own, that he may ſee what Kinds thrive beſt there, and ſuit his own Plantation accordingly. As plain and obvious a Thought as this may be, it is not follow'd. The Work is done at random, and ſucceeds accordingly.

The Huſbandman in Kent and Sussex, tho' he ſees the Aſhes in his Neighbours Hedge Rows fair and thriving; and the Elms in the ſame Plantations, crooked, ſtubbed and hollow; yet when he makes his own Hedge, ſets Elms, and they grow hollow and ſtubbed like the others, neglecting the Tree that he ſees thrive ſo admirably.

Cuſtom has been uſed to guide the Huſbandman in England, without his ever conſulting his Reaſon, or even Experience. We hope that one good Effect of this Book will be the leading him to uſe both in a proper Manner; and that ſeeing how neceſſary ſuch a Conduct is, and how uſeful, he will for the future try Cuſtom always at their Tribunal, and accept, or reject it, according to their Sentence.

There is one Caution the Huſbandman is always to take with him in the planting the Aſh; that is, that too many of them muſt not be planted in the Hedge Rows of plow'd Lands. The Aſh ſpreads its Roots a great Way, and, if not prevented, its Branches alſo. When this latter is the Caſe, the Drippings from them hurt the Corn, and when the pruning prevents this, ſtill the Roots ſpreading ſo near the Top of the Ground, take the Nouriſhment that ſhould ſupport the Corn: and another Inconvenience ariſing from them is, that they obſtruct the Tillage of the Ground by their Frequency and Toughneſs.

From theſe general Obſervations on the Aſh, the Huſbandman will know where, and in what Manner to plant it in his Grounds; and, when planted, how to manage it to the beſt Advantage.

If he plant it on a bad Soil, and in an expoſed Situation, let him uſe it as Coppice Wood,

covering the Ground either with Aſh alone, or with that and ſome other hardy Kinds, and cutting them down at twelve or fourteen Years Growth, and afterwards every ſeven or eight Years; if he plant the Aſh on a hungry ſtony Soil, let him ſhrowd it at the Height of ten Foot, and keep it as a Pollard. When he has Hedge Rows on good light Land, ſeparating Meadow and Paſture Grounds, let him ſet Aſh plentifully in them; and never let him forget it when the Soil is chalky.

The Aſh does not like the Elm thrive only when it is open every Way to the Air, it is a very good Tree in Woods; and indeed ſo profitable, that they ſhould in very few Caſes be planted, without a large Proportion of this Kind; for it grows no where quicker than among Trees every Way, if the Soil ſuit.

The Soil that agrees worſt of all with the Aſh, is a wet Clay: not but this Tree will bear a great deal of Moiſture, where there is not that Coldneſs and Solidity in the Ground; for we ſee it growing at ſome ſmall Diſtance from Rivers in many Parts of Buckinghamshire, and it thrives no where ſo happily. The Timber when felled, is whiter when it has grown in theſe Places than in any others, but it muſt be confeſſed, it has not altogether that Strength it poſſeſſes in drier Soils.

The Aſh is an Enemy to all ſmaller Growths: and no Tree drains a Land ſo much of its Nouriſhment. If planted too near Gardens, it will ſtarve the Fruit Trees, and hurt every Thing that is propagated within the Reach of the ſpreading of its Roots; and much more whatſoever is within the Drippings of its Branches.

CHAP. XXIII.

Of the Propagation of the Aſh.

THE Aſh is beſt propagated by ſowing the Seeds; and this may be done either in the Places where the Trees are to ſtand, or in a Nurſery from whence they are at a proper Growth to be removed into thoſe Places. The common Cuſtom of Writers is to give one or the other of theſe Methods as the beſt, without any Exception; but we hope to introduce a more reaſonable Practice. It may be moſt convenient to raiſe the young Trees in a Nurſery for ſome Purpoſes; and for others it will be found beſt to ſow them where they are to ſtand. Let the Huſbandman therefore conduct himſelf, not according to any general Direction, but according to the Situation and Deſign of his Plantation.

Let him conſider whether he intend to raiſe his Aſh in Hedge Rows, in Coppices, or Woods, or in Clumps upon expoſed Situations, as in Parks, or on the naked Hills where little elſe of Value will ſtand: for, according to theſe ſeveral Conditions, the Practice he is moſt advantageouſly to follow, will differ.

If his Aſhes be for Hedge Rows, it is beſt to raiſe them in the Nurſery, and to remove them thither by two Tranſplantations: if for Clumps, or for Coppice Woods, 'tis beſt to ſow them on the Spot; but when they are to make a Part of large Woods, the Soil and Situation muſt determine, for on a very good Soil they do beſt by Tranſplantation; but it is beſt raiſing them immediately from Seeds, where the Land is barren, and will not yield them a ſpeedy Nouriſhment when tranſplanted.

The Aſh may be raiſed as the Elm by Layers, but it does not ſucceed ſo well: and the Huſbandman may purchaſe the young Shoots, or Suckers, from thoſe who draw them in the Hedges, but they never riſe to be ſuch fine Trees, nor grow ſo quick; this Experience abundantly confirms, and therefore it is that the Method of raiſing them always from Seed is to be prefer'd; though with this Difference, that ſometimes 'tis beſt to do it on the Spot, ſometimes in the Nurſery.

Which ever of theſe Methods the Circumſtances of the intended Plantation require, the firſt Care is to get a neceſſary Quantity of good Seed. Let the Huſbandman not buy this, for if he does, he is never ſure of its Goodneſs; and 'tis eaſily in his Power to collect it under all poſſible Advantages. Let him ſet his Eye upon a tall, lively and flouriſhing Tree, and watch the ripening of its Keys. When they are thoroughly ripe, let him ſend up a Servant to ſhake the Tree well; and if they don't fall readily this Way, as in ſome Seaſons they will, and in others they will not, let him ſee a Quantity of the Bunches cut off, ſelecting the fulleſt, beſt and largeſt.

The Seeds being thus got, let them be ſown according to the Intent of the Plantation.

If the Trees be intended for Hedge Rows, or for Woods, upon a very favourable Soil, they are to be ſown in a Nurſery; but if for Coppices, in Clumps; for Parks or in Woods, on poor Ground, then on the Places where they are to ſtand.

CHAP. XXIV.

Of raiſing Aſh in a Nurſery.

THE laſt Week in October, which is the Time of the Aſh Keys ripening, let a ſmall Bed of Earth be well dug, and perfectly cleanſed from all Sorts of Weeds. 'Tis beſt to chuſe for this Purpoſe a Piece of Ground that has not been wrought before. The Soil ſhould be light but poor, an ordinary Loam where there is Choice, is preferable to any other: but this is not ſtrictly neceſſary.

When this Earth is well prepared by turning and breaking the Clods, let the Aſh Keys be ſpread for a few Days after their Gathering, upon a Floor of ſome airy Room, where the Sun does not come; and being thus a little dry'd, let them be ſown thick in ſhallow Trenches open'd a-croſs the Bed, at four Inches Diſtance. Let the Earth be drawn over them with a Rake, and the Bed made perfectly level; and ſo leave them to the Courſe of Nature. Nothing will be ſeen of them till about ſeventeen Months after; and they will then riſe in vaſt Plenty along the Places where the Trenches run.

During

During the Time the Seeds lie in the Ground, as well as after they are up, the Bed muſt be kept very free from Weeds; and in the Spring, if there are not frequent Showers the Plants ſhould have a little watering. Sometimes, if the Keys be gathered very ripe, the Ground freſh and good, and the Seaſon particularly favourable, the Aſh Keys will riſe the firſt Spring: but they uſually lie till the ſecond, and we have therefore prepared the Huſbandman to expect it.

The Authors on theſe Subjects who are as ready to abuſe, as they are to borrow, from one another, inſult each other upon the ſuppoſed Errors about the Time of the ſhooting of Aſh Keys; but we are to inform them from Experience, that the Truth may lie on either Side, and thoſe who may write from what they have ſeen who contradict one another; for that it is ſometimes the firſt, and ſometimes the ſecond Spring they ſhoot, but much oftener the latter.

A Nurſery muſt be early prepared to receive the young Trees from this Bed, for the Aſh bears, and requires tranſplanting from the firſt Shoot, earlier than any other Tree whatſoever.

I have always found it moſt beneficial to remove them out of the Seed Beds at ſix Months Growth, one Summer being enough for their ſhooting; and their Roots piercing too quick for deferring it.

Therefore let a larger Piece of Ground be well dug, and clear'd of Weeds, for the Reception of theſe young Trees, the Autumn after their firſt Appearance above Ground. Let Trenches be open'd all over this Ground, at three Foot Diſtance, and let them be deep and wide enough to receive the young Trees, without Injury to their Roots when prepared for them.

The Ground being thus prepared let the young Trees be taken up: but this requires more Care in the Aſh than in many other Kinds; for the ſame Reaſon that this requires to be tranſplanted younger than the others. The Roots muſt be a little looſen'd with a Spade, and then carefully rais'd without breaking. The tap Root, or ſtrait Root that runs down, muſt be cut off at a few Inches Length; the Reſt muſt be left as they are: and the young Trees in this Manner muſt be carefully ſet in the Trenches, at about fifteen Inches Diſtance from one another; and the Earth cloſed and preſs'd down about them.

They are to ſtand in this Nurſery four Years, and then to be removed into the Places where they are to remain: but in order to their growing regularly, ſome Care is to be taken of them while they are in this Nurſery. Weeds muſt be kept thoroughly away, that they may have all the Nouriſhment the Earth can give them; and they muſt be trim'd up every Winter, cutting off the Side Branches.

It will greatly aſſiſt their Growth if the Earth between the Rows be dug up every Spring: and at their firſt bringing into this Nurſery a little Care may be well employed, in ſeeing that they keep upright, and that the Earth be well clos'd about them, which is beſt done by treading it down. Late in the Autumn of their fourth Year, in this ſecond Nurſery, they are to be removed into the Hedge Rows where they are to ſtand; or to be brought into the new Plantations of Foreſts, where a good Hole is to be opened to receive them, and Care taken to ſet them upright and keep them ſo.

The Diſtance for planting them in Hedge Rows, is about five and twenty Foot. In Woods intended for long ſtanding, and a good Growth of Timber, an Aſh may very well and very profitably be planted, every third Tree; and in this Caſe, about nine Foot every Way is a proper Diſtance.

If Aſh would be rais'd alone, as it may in many Places, with great Benefit to the Owner; the beſt Method is to plant them at eight Foot diſtance every Way in the Place, and at the End of the firſt Year, going over the Plantation to cut down every other Tree at ſix Inches from the Root: chuſing the worſt Shoots for this Purpoſe, and leaving the ſtraiteſt and beſt ſtanding.

This thins the Plantation for the preſent to one half, and gives it a double Kind of Growth. Theſe Stems which have thus been cut off, will ſend up many ſtrong Shoots, which will grow into good Poles in five or ſix Years, fit for the Hoop-makers and many other Uſes; and they will thus, at proper Times, yield a Supply of ſmall Aſh in the Manner of a Coppice, very uſeful for this Purpoſe; and all the while the others which were leſt ſtanding, will be ſhooting up into beautiful and ſtately Trees, which in thirty, forty, or fifty Years, according to the Nature of the Soil, will be of great Value.

The Soil alſo muſt determine whether the whole Number left at this firſt Reduction ſhall ſtand for Timber, or whether they require to be thin'd again; if ſo, let this be done with Diſcretion; and always the worſt taken for cutting down for ſmall Wood, and the talleſt and ſtraiteſt left for Timber.

When the Aſh is removed into the Place where it is to ſtand, ſome of the ſide Branches may be taken off, but the Top is never to be cut. If that be to be done at all they muſt be cut down to the Ground, and ſtand for a Supply of Poles, or at a greater Height for Pollards. For if the Top be once injured, they never make Timber.

There is this Advantage in the Aſh, that where it will not do for one thing, it will for another; and at any Time, when it is ſeen that a Tree will not thrive for Timber, it may be cut off at ſix or eight Inches, and will then ſucceed very well. This may be done at any Time, and the moſt ſickly Aſh will revive upon it.

CHAP. XXV.

Of raiſing Aſh where it is to ſtand.

THERE remain yet ſome other Plantations of the Aſh to be conſidered, theſe are, firſt, when it is to be a Part of Coppice Woods. Second, when it is to be rais'd in Woods on a poor Soil, either entirely of that Kind, or of that mixed with other Trees; and, thirdly, when it is to ſtand in Clumps in Parks, or ſingly upon high and barren Grounds. In all theſe Caſes the beſt Method is to raiſe it where it is to ſtand, but there is a different Way of doing this, in order

order to ſuit it beſt to the ſeveral Circumſtances. We ſhall therefore give the Directions ſingly.

When the Aſh is to make a Part of Coppice Woods, there ſhould always be a double Intent in the Plantation, ſome of the Shoots being to be cut for Poles among the other Coppice Shrubs at the ſeveral Fellings, and ſome to be left to ſtand for Timber.

The Aſh may be let into theſe Coppices either at their firſt Plantation, or after any of the Fellings; and the Method is this.

When the Growth of the other Shrubs is at ſome Height, whether from the firſt Shoot, or any ſubſequent Felling, let the Huſbandman go over them with a Trowel in his Hand, and ſome choice Aſh Keys in his Pocket; the Seaſon for doing this muſt be the End of October, and the Keys juſt gathered, and a little dry'd, as has been already directed for preparing them for the Nurſery. He is to open the Ground with his Trowel, in convenient Places, and let in a few of the Keys. Theſe he is to cover with the Earth taken up, to about half an Inch depth, and then to draw the fallen Leaves over the Place by way of Shelter, and to detain the Moiſture. The Places where he is to introduce theſe is where there is moſt Vacancy, and where the Soil is fineſt, and there is moſt Moiſture if the Situation in general be dry.

Theſe will ſhoot very favourably, and the Autumn or Autumn Twelvemonth following, according as they have ſhot the firſt or ſecond Spring, he is to go over the whole Coppice and examine his young Plants, cutting off thoſe which riſe crooked, within five Inches of the Ground, and leaving the others for Timber Trees.

Thus will he thicken his Coppice in a very eaſy Manner, and that with one of the moſt valuable Trees he can plant in it. Thoſe Aſhes he has cut off will riſe in Cluſters of Poles, to be cut down with the reſt of the Coppice Wood at every felling: the others will grow well, and are to be left ſtanding in ſufficient Number for Timber. When they grow too cloſe the Woodman muſt cut down ſome of them, at the firſt Felling of the Coppice, leaving the Stumps to ſupply the ſmall Growth of Poles for that Purpoſe, in the future Cuttings; and the other Trees to grow up for Timber.

As this is a particular Practice in introducing the Aſh into Coppices, 'tis fit the Huſbandman ſhould know the Reaſon of it.

If the Coppice have been rais'd by planting from the Nurſery, the Aſh will not grow well in it, unleſs the Soil be particularly good. Then as the Aſh requires a Time of tranſplanting from its firſt Beds, different from other Trees, being much earlier, it is beſt to raiſe the Supply of thoſe ſeveral Kinds without it.

'Tis alſo a quicker Grower than the Generality of other Coppice Trees; inſomuch that if it be brought into the Plantation long after the others, it will riſe to an equal Bigneſs with them by the Time of felling; for the common Growth of a Coppice is from twelve to twenty Years the firſt Time; and theſe Aſhes will riſe to very good and uſeful Poles in ſeven Years after the cutting the Shoots down to the Ground.

When the Coppices are rais'd by ſowing, the Aſh Keys may be ſown with the other Seeds, and take their Chance: thus will they only outgrow many of the other Kinds; and there is no great Harm in that; but this Way of introduceing them afterwards, is preferable for many Reaſons. It places them not at Random, that they muſt ſtand when rais'd with the reſt of the Coppice Wood, but juſt in thoſe Places where they will thrive beſt; and the Advantage beforenamed, of thickening the Coppice with ſo uſeful a Growth and in ſo eaſy a Manner, is far from trivial.

There remain two other Occaſions in which the Aſh is beſt propagated immediately from the Seed in the Places where it is to ſtand, that is, in the Woods deſigned for Timber on a poor Ground, and in Parks, and other expoſed Situations. In Woods, when the Soil is good, the Aſh may be brought in at four Years Growth very properly, and will thrive very well, becauſe as much as it is ſtop'd by the laſt Removal, ſo much, or more, it will be aſſiſted by the ſuperior Goodneſs of the Soil. But when that is indifferent; and perhaps worſe than the Ground of the Nurſery, it is beſt to ſow the Seeds there; for no Trees ſucceed well on being tranſplanted, unleſs it is on a better Ground.

As to thoſe Aſhes which are to ſtand ſingly, or in Clumps in Parks, or other expoſed Situations, they are beſt raiſed from the Seed there, for the ſame Reaſon; the Expoſure otherwiſe checking them, if brought from a Place where they were ſheltered, as Nurſeries uſually are, as much as the barren Soil.

In either of theſe Caſes the Method to be obſerved is this. Let the Ground be opened in every Place where an Aſh is intended to be rais'd, to the Depth of two Feet, and very well turn'd, and the Clods broken. When the Ground is thus prepared, let about a Dozen Aſh Keys, of the ſoundeſt and beſt Kind, be ſet in each Place, and defended till they come up by Buſhes laid over, or a low dead Hedge carried round the Spot. When they have ſhot let half of them be pull'd up, leaving the moſt promiſing; and after this, at different Times, let all the others be taken up, except one, leaving the fineſt and moſt regular.

This muſt be carefully done every Time, that the Roots of the remaining Tree may not be diſturb'd. It is then to be defended by Pales, or otherwiſe, and carefully trim'd up in the Winter, to take off all ſtraggling Branches, and carry it up ſtrait and regular. There is no doubt of thus raiſing fair and rich Trees.

The more common Practice for raiſing an Aſh Wood, is to plow the Ground intended for that Purpoſe, and ſow the Keys upon it, thinning them after they are of ſome ſmall Height; or others ſow Oats with the Keys, and gathering that Crop at a proper Seaſon, leave the Keys to ſhoot at their Leiſure, under the Shade and Defence of the Stubble.

We have mentioned this Method of ſowing already, for the raiſing of a Coppice; but for an Aſh Foreſt deſign'd for the Timber, this Method is not comparable to the before-mentioned, which very well pays the additional Labour by the better Growth of the Trees.

At all Adventures, the raiſing ſuch Aſhes as are deſigned for Timber upon the Places where they are to ſtand, is, in theſe Caſes, vaſtly preferable. We deſire Timber Trees ſhould be of an even and uniform Growth; and ſuch they are if rais'd from Seed in their Places, becauſe they meet with no Stop; the Nouriſhment yielded by the Ground, be that more or leſs, being regularly conveyed to them: whereas all Trees have ſome Stop at the Time of tranſplanting, before their Roots have laid hold thoroughly of the new Earth; and none ſo much as the Aſh. It is allowed by all who are concern'd in theſe Tranſplantations, that the Aſh, for the firſt Year after its ſecond Removal, makes very little Progreſs in its Growth; which ſhews the Diſadvantage that ariſes from the Removal; and how much better it is that the Trees of this Kind, deſign'd for Timber, ſhould be ſown in the Places where they are to remain, that they may have no Check in their Growth.

CHAP. XXVI.

Of the lopping and felling the Aſh.

WE have conſidered the Aſh as a Coppice Tree, a Pollard, a Hedge Row, and Foreſt Tree, in the raiſing; and it muſt be regarded in all theſe Lights alſo to the End: for it is frequently uſed in all the four Kinds, and a Method not altogether the ſame is to be followed in treating it under theſe ſeveral Forms. In Coppices it is to be cut with the other Wood, when rais'd in Poles by cutting off the Shoot while young; but when it ſtands for Timber among theſe Plantations, Care muſt be taken it does not ſpread out too much into Head, for the Drippings from that Breadth of Top would do a great deal of Harm to the young Growth after every felling.

When the Aſh is cut as a Pollard Care muſt be taken to keep all its Boughs at ſuch a Height, that they be out of the Reach of Cattle; and the Huſbandman muſt conſider the Aſh is a Tree of quicker Growth than moſt others, and cut off the Shrowds accordingly, oftener than he would from moſt other Kinds. In theſe Pollards he is alſo to obſerve carefully the State of the Trunk. It grows hollow ſooner than many other Kinds, and then it loſes its Value, and yields fewer and fewer Branches for lopping every Time, and they grow more ſlowly. I therefore adviſe the Huſbandman to keep up a Stock of theſe, by now and then planting freſh ones for this Purpoſe, and cutting them off at a proper Height. And theſe being thus ready to take the Places of the old Set, let him cut down theſe as ſoon as they begin to be hollow at the Top, anticipating their Decay. Thus he will have the Benefit of their Branches, for which theſe Pollards are principally rais'd, as long as the Tree bears them in Quantity, and with Vigour; by cutting up the Tree when it begins to ſhew the firſt Signs of Decay, he will have the Advantage of ſo much good Timber as the Tree affords; and he will have freſh and vigorous ones ready in the Places of thoſe he deſtroys. Theſe young Trees ſhould be planted evenly, one between every two of the old ones; and the Roots of the old ones ſhould be grub'd up, that the young may have full Liberty for ſpreading theirs: and thus it will be proper to go on from Generation to Generation, always preparing a Supply in Time.

When the Aſh grows in Hedges it muſt be lop'd carefully, and often: neither the Loppings here, nor in the Pollard Aſh, ſhould be ſuffer'd to grow too large; and the beſt Seaſon for cuting off both is in Spring. It muſt be prevented from having too large an Head in Hedges, as in Coppices, and for the ſame Reaſon to prevent the Miſchief ariſing from its Drippings, and it will thus riſe into a noble and regular Tree.

In Woods and Parks proper Care muſt be taken in forming and training the Aſh at firſt, but afterwards it requires no lopping. It muſt be carried up in a ſtrait and uniform Trunk in Woods: but in Foreſts it may be ſuffer'd to branch out after a certain Height, as from twenty Foot or thereabouts. This takes off ſomething from the Value of the Timber, becauſe of breaking in upon the Length; but it gives the Tree a finer Top, and a more beautiful Aſpect, which is a Thing regarded in thoſe Plantations; and the Quantity of the Timber is not leſſened, though the Value is in ſome Degree abated, for theſe large Arms yield a great deal.

The Time of felling the Aſh is the Depth of Winter, when the Sap is altogether at reſt; for when cut down at any other Time, it becomes ſubject to Worm-eating, and loſes a great Part of its Value. It is to be fell'd in November, December, and January; but beſt of all about Christmas Time. And in felling the Workmen muſt take Care to cut it off as cloſe to the Ground as poſſible; and if it be one that has grown in a Park, or elſewhere, when the Head has been indulg'd, the larger Boughs muſt be carefully cut off while it is ſtanding, or a great deal of the Timber will be ſpoil'd in the Fall. The beſt Time of all for cutting ſmall Aſh, in whatever Form, is toward the Middle of February.

CHAP. XXVII.

Of the Uſes of the Aſh, and its Value in Plantations.

THE Growth of the Aſh, which is quick and regular, recommends it in Plantations about Houſes and Gardens; keeping a due Diſtance between theſe Trees and the Garden Ground; and the Make of its Leaves ſo different from that of the other common Kinds in theſe Plantations, gives a great and a very pleaſing Variety. Thoſe who are curious in Trees ſhould always raiſe Aſh alſo in their Nurſeries for another Uſe, that is, to bud upon it the ſeveral foreign Kinds mentioned in the firſt Chapter on this Subject, all thoſe ſucceeding better here upon that Stock, than when rais'd without budding.

No Wood is ſo ſweet in the Bud as the Aſh, and for that Reaſon there is none on which Cat-

tle ſo much love to browſe. It is to be defended from them in young Plantations, for this Reaſon, with great Care, but it may be made uſeful in a proper Manner, like the Elm, for the ſame Purpoſes. The Cuttings of the Aſh feed Deer in hard Winters, and are acceptable to any Cattle. Cows and Oxen, when they are ſuffered to feed upon the fallen Hedge, always devour the Aſh Shoots before they touch any other; and when any other Kind is offer'd to the Deer along with it, they always give the Aſh the ſame Preference.

The Aſh is very valuable for Fire-wood. No Kind whatever burns ſo free or ſo ſweet; and in caſe the Farmer have not a Stock before-hand, none anſwers his Purpoſe like the Aſh, for it will burn when freſh cut better than any other Kind whatſoever. This Freedom of burning green, and the Fondneſs of the Cattle for the Aſh Tops, are both owing to the ſame Cauſe. There is a ſweet and ſugary Juice with which the Aſh abounds, which is pleaſant to the Taſte, and is very inflammable; theſe Kinds of Juices, as may be ſeen in common Sugar, burning very violently.

The Timber of the Aſh is ſound and of great Strength, and is ſold at a large Price for many Kinds of Works. It is uſed greatly in building: And by the Coach-makers and Cart-makers. It will remain ſound a vaſt while when it can be kept dry, but it does not bear Wet like ſome other Kinds. There is a great deal of Difference in the Aſh, according to its Growth. The Ground Aſh is very ſtrong, and valued for many Purpoſes, although ſmall. A Bough of it exceeds any other, except the Oak, in Strength, Toughneſs, and Laſting. But there is, as in other Woods, a great deal of Difference between the Ground Aſh and the quartered Timber.

The Carpenter and Plow-maker in the Country uſe a great deal of Aſh, and the Wheelright finds no Wood comparable with it for his Purpoſe. The Harrow, and moſt of the Inſtruments in Huſbandry, are made of it. It ſerves excellently for Hoops, and other Parts of the Cooper's Buſineſs, and for the Turner; and ſome of it is ſo finely vein'd that it is uſed by the Cabinet-makers, and is called green Ebony. Poles of all Kinds are cut out of the Coppice from the Aſh Stumps. None are equal to them for the Hop Garden; and they are cut out for Paliſade Hedges, and a Multitude of other the like Works. Axles for Wheel Carriages are almoſt univerſally made of Aſh, and Blocks for Pullies, Oars, and Handles for Tools.

Upon the whole, as ſcarce any Timber is of quicker Growth than the Aſh, none is of quicker Sale, for every Bit of it will go to Market, from the main Trunk uſed for large Works, to the ſmalleſt Pole, or the leaſt Piece of the quartered Timber. For theſe Reaſons nothing can be more advantageous for the Huſbandman, where there is a convenient Piece of Ground, than the raiſing a Wood of Aſh alone. We have ſhewn the Method of doing this already, by ſowing a proper Quantity of the Keys, and cutting off the leaſt promiſing Shoots while young, leaving the ſtrait and fine at proper Diſtances for Timber. In this Management there is an annual Income from the Plantation, all the while the Trees are geting their due Bigneſs for Timber. The Underwood from thoſe Shoots which were cut off, becauſe uneven, may be cut every ſix or ſeven Years; and in a large Plantation a ſixth or ſeventh Part every Year, which will be of ready and good Sale for Hop Poles, Garden Poles, and the like Things. Wood for all theſe Purpoſes is had from theſe Stumps, each of which, as ſoon as cut down in the Manner already directed, ſends up a Number of Shoots, that in this Time arrive at a Growth ſufficient for all thoſe Uſes; and are, after that, to be cut once in ſix or ſeven Years, with the ſame or greater Advantage during all the Time the Timber Trees are growing, which may be from thirty-five to fifty; or five and fifty Years, according to the Nature of the Soil, the Situation, and other Advantages or Diſadvantages to the Growth.

CHAP. XXVIII.

Of the Beech, its beſt Soil and Situation.

THE Beech is a tall, ſtout, and well-growing Timber Tree. The Leaves are broad and ſhort. The Flowers are ſmall and inconſiderable, theſe ſtand together in little Branches. The Fruit grows on other Parts of the ſame Tree, and conſiſts of two Nuts encloſed in a rough hairy Caſe. Theſe Nuts are the Seeds of the Beech: they are of a triangular Figure; and their hairy Caſe is divided into four Parts. Theſe Fruits, all together, are what the common People call the Beech Maſt.

The Gardiners and Nurſery-men keep what they call the Silver Beech and Gold Beech, and the Planters of moſt Curioſity tell us of the Mountain Beech, and the wild Beech: this would lead an unwary Perſon to believe, that there were three or four different Kinds or Species of Beech, as there are of Elm, but it is not ſo. As to the Nurſery-men's Trees they are only the common Beech, with its Leaves variegated with white or yellow, like the other of their Curioſities in that Kind; and as to the Mountain Beech and wild Beech, they are the ſame Tree; and the Difference the Planters ſpeak of, in the Colour and Firmneſs of the Timber, is owing to the Soil and Situation, not to any thing in the Species of the Tree, for the ſame Seeds will in different Soils raiſe both Sorts.

The natural Soils of the Beech is a dry, light, and warmLand, Richneſs of Earth it does not at all require, which is a Thing of great Advantage to the Planter, if he would ſufficiently regard the ſuiting his Trees to his Land. Beech will thrive on the drieſt and moſt ſandy Soil; or among raw Gravel or Stones, nay almoſt upon Rocks. In many Places where one ſees Beeches of a vaſt Growth, one is, at firſt Sight, aſtoniſhed to conceive whence they have their Nouriſhment; but upon examining their Roots the Wonder ceaſes, for they are found to penetrate to a great Depth, and to ſpread a vaſt Way when arrived at Places where there is Moiſture and Nouriſhment; as many other Trees Roots do, at all

all Adventures, immediately under the Surface of the Ground.

As the natural Soil of the Beech is ſandy or ſtony, the proper and natural Situation of it is on Hills, but it thrives better on their Sides than abſolutely at their Tops, where it is too much expoſed. Chalky Soils alſo ſuit very well with the Beech; and, in general, thoſe Soils and Situations which are moſt improper for the Generality of other Growths whether of Trees or Herbage.

The Advantage both to the Publick and to private Perſons, would be very great if they would pay a proper Regard to what Nature directs, in their Plantations of Timber Trees. Each has its proper and natural Soil in which it will always thrive; and there are ſo many Kinds of them, that one or other of them will agree with any Soil a Man can have; and they will all bring a Price. How aſtoniſhing is it then, that People who are about to plant, will fruſtrate their own Expectations, by ſuiting the Trees to their particular Fancy, rather than to Nature. 'Tis but a few Years ſince that I ſaw more than ſix thouſand Elms planted on a ſandy Gravel, down the Slope of a Hill, where they muſt come to nothing, and where Beeches would thrive excellently: and within theſe few Years a Huſbandman in my own Neighbourhood being about to raiſe a Coppice upon a good, but ſomewhat damp Piece of Ground, would, againſt all Advice, make a great Part of the Growth Beech.

Theſe People contradict Nature, and then wonder they have not Succeſs: they will not be adviſed how to ſucceed, and when they fail by their own Obſtinacy and Ignorance, they cry out, Who would plant; when, beſide the Length of Time, the Succeſs is ſo uncertain. Let the Perſon who is about to enter on this Buſineſs, but take his Directions from Experience, or from the collected Maxims of it in this Work, and no Practice whatſoever in the Compaſs of Huſbandry is ſo ſure of Succeſs.

The Plenty of Beech in many Parts of England, where there are vaſt Tracts of Land cover'd with Woods of it, has led ſome to cenſure Cæsar, who ſays, There was no Beech in Britain. But 'tis poſſible the Romans might be right; the Elm, as common as it is at preſent, is ſuſpected, with Reaſon, not to be a natural Product of our Iſland. There might therefore be a Time when there were no Elms in England; and yet, from the Face of Things at preſent, it would appear much more improbable to ſay this of the Elm than of the Beech.

To prevent Miſtakes with Reſpect to the moſt antient Accounts in which this Tree is ſuppoſed to be named, it is proper to obſerve, that what is underſtood to be the Name of the Beech in many of the old Greek Authors, is really uſed by them to expreſs the Oak, as appears from their accidental mention of the Fruit.

The Beech is at preſent confin'd as it were, to ſome Counties of England, being altogether unknown in others. Nature has indeed ſuited this Tree to ſome particular Soils and Expoſures, and as we have ſome Counties moſtly hilly and dry, and others, for the greater Part, low and wet; if the Beech were univerſal in the one, and deficient in the other, it would ſeem reaſonable, but there are no ſuch Grounds for the Want of this Tree in many Places.

There are many Counties as generally fit for it as thoſe where it is moſt plentiful, where yet a Tree of it is never ſeen: and many thouſand Acres of Land in this Kingdom on ſtony and chalky Hills, are left uſeleſs, where the Beech would proſper and yield an incredible Profit.

We hope by theſe our Labours to make the Benefits of ſome Parts of the Iſland reach others where they are not known at preſent; and there is none in regard of which this may better be done than the Beech Plantation.

It is in the Power of many who lament the Smallneſs of the Produce of large Tracts of Land, to raiſe upon thoſe which yield leaſt of all, ſuch Growths of Beech as ſhall make them exceed the moſt fruitful in Profit.

CHAP. XXIX.

Of the Propagation of the Beech.

THE Beech may be propagated from Seed, or from Suckers, but the firſt Way is the moſt eligible, always affording the beſt and faireſt Trees; and the Succeſs being much more certain. Thoſe who intend to plant any conſiderable Number of Beech, ſhould never think of any other Method, but where only a few are wanted, that Trouble need not be taken, but the Way of raiſing them from Suckers may anſwer the Purpoſe.

Thoſe who plant Suckers, commonly buy them from the common People who draw them together with the Elm, Aſh, and other Kinds for Sale: but as theſe People take them up careleſly, and at random, good and bad together, I adviſe the Huſbandman who intends to ſpare himſelf the Trouble of a Nurſery, at leaſt to draw the Suckers for himſelf, that he may chuſe good Plants, and have a good Root.

When he has got a ſufficient Number of theſe, let him plant them at once where they are to ſtand, and take Care to open a good Hole in the Ground to receive them, that the Roots may not be injur'd; and to ſet them ſecure and ſteady, ſupporting them by Stakes as they firſt grow up. If he will take this Care, he need not be uneaſy at their growing ſlow for the firſt two or three Years, or even at their riſing knotty and crooked, for they will out-grow all this: they will afterwards ſhoot apace, and become ſtrait and fine Trees.

This may do well for the raiſing a few Trees, but when a Foreſt of Beech is propoſed, or a large Quantity in Parks, for which they are very fit, the Way is to raiſe them from Seed.

There are two Methods of raiſing Timber Trees from Seed, as before obſerv'd, the one by ſowing them in a Nurſery, the other by laying in the Seed at once, where the Trees are to ſtand. We have recommended the raiſing the Oak in its Place, becauſe of the ſtrait Growth, and the Aſh, becauſe its long Root renders it leſs fit than many other Kinds for removing:

now, though the Beech is liable to neither of theſe Objections as to tranſplanting, becauſe it will very well bear a Removal while young; and will out-grow a Defect in Shape better than any other Tree, yet there is another very ſubſtantial Reaſon for raiſing it where it is to ſtand; which is the Poorneſs of its Soil. It is a general Rule that Trees muſt be rais'd on a poorer Ground in the Nurſery, than that where they are deſign'd to grow; but the proper Soil for the Beech is ſo poor, that the Nurſery cannot well be made in a poorer: and it is certain, that a Tree never does well on tranſplanting, unleſs it be removed into a better Soil.

For the Sake of thoſe who will follow their own Method in all Things, we ſhall, however, lay down the beſt Way of managing it in this Manner.

For the Nurſery Way, let a ſmall Bed be dug in a poor, raw, gravelly or ſtony Soil, and ſome good Beech maſt be gather'd from a thriving Tree, and ſown in it in Trenches three Inches deep, drawing the Earth over it with a Rake. When the Bed is thus prepared and ſowed, it is to be kept clear from Weeds; and when the Plants riſe, they are to be watch'd, and in the firſt Autumn after their ſhooting, ſome of them, where they grow thickeſt, are to be removed into a larger Piece of the ſame Ground: the next Autumn, a ſecond Parcel are to be drawn out of the Seed Bed; and a third Parcel, the Autumn afterwards; then leaving only a few at proper Diſtances, as the others are placed in the new Ground.

Upon the Removal they are to be ſet in Rows a Foot and half diſtant one from another, and the Rows a Yard diſtant; and they are to be kept there three or four Years, digging between the Rows in Spring, and keeping clear of Weeds.

This is the Method where a Nurſery is uſed; but I think the ſowing upon the Spot preferable; and in this ſome Difference is to be obſerv'd according to the Nature of the Plantation. If a large Tract of Ground is intended to be cover'd with a Beech Foreſt, the Plow is to be uſed; but if ſome Clumps of them are to be raiſed in Barks, or other Plantations, the Spade is preferable.

When theſe large Plantations are intended, or where the Trees are to be raiſed for Beauty, a particular Care is to be taken in the Choice of the Seed. The maſt is to be gather'd from the talleſt and moſt beautiful Trees, and to be ſown as ſoon as it has been a little dry'd, by ſpreading on the Floor of an airy Garret, not expoſed to the Sun.

For the ſowing a Foreſt, let the Ground be twice plow'd, and well harrow'd to break the Lumps; and let the Seeds be carefully ſcattered, and well covered. After this when they riſe, let the Weeds be kept under, and from time to time let the Growth be thinned till the young Trees are left ſtanding only at nine Foot Diſtance every Way.

After this let the Planter go through them every Winter, and carefully trim them up for Timber Trees, taking off ſuch ſide Branches as would draw the Nouriſhment from the Trunk; and when he has thus ſet Nature into a right Courſe, let him leave her to herſelf for the Succeſs.

In Parks, and other Plantations, where Beauty is conſider'd as well as Uſe, the Spade is to be employ'd inſtead of the Plow, becauſe the Ground is to be open'd for the Seeds only in a few Places, and the Seeds muſt be more carefully ſet and cover'd.

For this Purpoſe the Beech ſhould be allowed five and thirty Foot Diſtance every Way between Tree and Tree. It will in the Growth very well fill up this Space, ſpreading into a noble Tree, and making an elegant Appearance when full of Leaves, as they are very numerous and ſhining.

At every thirty five Foot let a Hole be open'd, and the Earth being well ſtirred, let five or ſix Seeds be ſet in it at three Inches depth, and at equal Diſtance from one another.

Beech Seeds are very apt to be eaten by Vermin, and the Hope of a whole Plantation may be ſo deſtroy'd, but if they are carefully cover'd at this Depth, they are ſecure.

When they ſhoot up, the weakeſt are one after another to be drawn, and at laſt one Plant only is to be left in each Hole; which is to be defended, as has been already directed for the Oak, and will not fail to grow up into a noble Tree.

It very ſeldom happens that any of ſuch a Plantation die; but to provide a ſupply for ſuch a poſſible Accident, let ſome of the beſt of the young Shoots that are drawn, be ſet out in a Nurſery Bed, where being of an equal Age, they will be ready to ſupply a Failure in the Plantation.

Theſe Beeches are to be trim'd up as they grow, but at five and twenty Foot they ſhould be ſuffer'd to ſend out two or three large Branches, for this makes the Beauty of a Tree for a Park.

At this Diſtance they will not in the leaſt interfere with one another, and if the Soil and Situation favour them, they will grow to a ſurprizing Height and Bigneſs.

In many Places the Beech may be planted in Hedges very profitably; and, as to the Difference of the two Kinds, the Mountain Beech, and the wild Beech, the Planter will be able to raiſe both out of the ſame Parcel of Seed, only by ſowing them in a different Soil and Situation. Thoſe which he raiſes on dry hilly Places, will be Mountain Beech; and the Timber will be white and even grain'd. Thoſe which he raiſes in lower Grounds, and Hedge Rows, will be wild Beeches; and the Timber will be darker in Colour, and though of a more uneven Grain, it will be of a firmer Subſtance, and more durable.

As to the Lopping of this Tree, it requires leſs than moſt others, for the greateſt Care is in the pruning it while young. When this is carefully done, and the Tree train'd to a proper Growth, it produces few ſide Shoots when in Woods; and in Parks it only ſpreads at the Head, as deſign'd. When planted in Hedges, it is to be treated as the Aſh, and other Hedge Row Trees; and when cut for a Pollard, which it may very well be, it is to be ſhrowded once in about eight Years,

Years, and that always in Spring. For if the Shrowding be ſuffer'd to grow too large, or be cut off in Winter, the Wet will get in and damage the Trunk, which is very apt in this Tree to grow hollow from ſuch Injuries.

It is to be felled any Time from the Beginning of the Month of NOVEMBER, to the End of FEBRUARY, but the Timber keeps beſt when it is cut in the Depth of Winter.

CHAP. XXX.

Of the Uſes and Value of the Beech.

THE Beech, when we conſider at large its Uſes and Value, is not to be look'd upon only as a Foreſt Tree, but as one for the Garden. Its Beauty in Parks we have mention'd already, in which Reſpect no Tree whatſoever exceeds it.

In Gardening few Kinds are ſo proper for the making large Hedges to ſurround conſiderable Plantations, or large Wilderneſs Quarters. In this Condition they may, with due Care, be kept very regular, and will be as beautiful as they are uſeful: but the Gardener is to know that this is a very quick ſhooting Tree, and that its young Branches ſoon get Strength: for this Reaſon he muſt be ſure to cut his Beech Hedges twice a Year; for when they are let alone but a little while, he will find it extreamly difficult to get them again into Order.

There is another Reaſon alſo why the Gardener ſhould raiſe a Stock of Beech Plants in his Nurſery. They are very uſeful for receiving the ſtrip'd Beech of both Kinds, by budding or grafting; and it is found to thrive better upon the wild Beech Stock, than when raiſed on its own. This indeed is true of moſt of the ſtrip'd Trees.

We have not recommended the Beech Tree in Coppices, becauſe if ſuffer'd to ſtand for Timber, the Drippings of the Leaves will greatly prejudice the young Growths after felling the Coppice: and for the ſame Reaſon thoſe who ſhall have a proper Soil for raiſing it in Hedge Rows, though they may do this to a conſiderable Profit, yet muſt take Care to lop it in ſuch a Manner, as to prevent the Damage it may otherwiſe do by its Shade, and the Drippings from its Leaves.

It is on the Sides of Hills that the Beech flouriſhes beſt, and yields the fineſt Timber: it will here ſtand againſt the ſtrongeſt Winds, better than almoſt any other Tree, altho' the Ground ſeem ever ſo looſe; but this is owing to its deep rooting, and to the Roots ſpreading ſo greatly at that Depth.

Let not any one be diſheartened if he ſee his Beech Plantation grow ſlowly, for in moiſt Soils 'tis the Nature of the Tree to do ſo at firſt. When it has been thus for two, three, or four Years ſpreading in Root rather than Top, it will begin of itſelf to thrive, and will go on without Stop or Interruption till it be arrived at its full Maturity, in which it exceeds moſt other Trees in Size.

The Fruit of this Tree called the Beech Maſt, is a moſt excellent Food for Hogs, and many other Creatures. Deer are very fond of it; as alſo Pheaſants, and many Kinds of Poultry. It fattens theſe Creatures excellently, and their Fleſh is never better taſted. The Leaves of the Beech are light and dry, when properly cured, beyond all others. It has been a Practice to ſtuff Mattraſſes with them. There is alſo another Uſe to which the Fruit of the Beech may be put, that is, the preſſing it for Oil; this it yields in ſuch Quantity, that a Buſhel affords a Gallon, and it is ſo ſweet and well flavour'd, when drawn with proper Care, that it may be eaten as Oil of Olives; and will ſerve excellently for ſeveral Purpoſes for which Oil of a large Price is uſed.

There was ſome Years ago an Undertaking ſet on Foot for the making this Oil, but it was ill contrived and very injudiciouſly executed, ſo that 'tis no wonder it fail'd: but that is no Argument againſt the ſetting about it again upon better Principles; and with wiſer Management. There is no Doubt to be made of its Succeſs for the Quantity and Quality of the Oil enſures it.

Thoſe who ſhould entertain Thoughts of ſuch an Undertaking, are not to be diſcouraged at the ſmall Quantity of Maſt they will ſome Years ſee on the Trees. The Beech does not bear regularly; but in general about one Year in three is a good one; and the Produce then is prodigious.

Thoſe who are curious in obſerving the Growth and Succeſs of Fruits, have often expreſs'd their Surprize at the great Difference there is found in the Quantity on the ſame Tree in different Years; and the more ſo as after keeping a ſtrict Watch of the Seaſon in that whole Year, they have frequently found nothing particular to occaſion it.

Several ingenious Perſons have mention'd this to me, and I ſhall take this Opportunity of propoſing my Opinions concerning the Cauſe, as there is no Kind ſo much liable to this Uncertainty of bearing as the Beech. The ſame Tree in my Neighbourhood having to my Knowledge yielded ſome Years not above ſix or eight Buſhels of Maſt, and ſome others fifty.

They who enquire ſo far into the Cauſe of this, as to examine the Seaſons of that Year, ſhould go a little farther back, and take Notice of thoſe in the preceeding. It is certain that the Weather of one Year will ſhew its Effects in the Fruits of another, eſpecially in Trees that grow on looſe and open Soils, and this in the common Courſe of Things is in no reſpect more the Caſe than in the Beech.

When one Year has been remarkably wet, it has been found to affect the Fruit of that which follows, and particularly ſuch as is produced by Trees that grow on looſe and open Ground: I ſhall mention, by way of Inſtance, the Vine. When one Year has been very wet, if the Vines be examin'd the next, they will be found to ſuffer by it extreamly; for, notwithſtanding there be ever ſo fair a Promiſe in the Spring, and the blooming Seaſon go on ever ſo well, very few Bunches of thoſe which ſucceed,

will come to any Thing. Nay, the Gardeners, without ſeeing the Cauſe ſo far back, will, at the pruning Seaſon, be able to foretel a bad Year at theſe Times, the bearing Shoots being poor and crude. On ſuch Occaſions the firſt Crop fails, and often a ſecond is produced, but this is always too late in the Year for its arriving at any Perfection.

On the other hand, whenever there is a remarkably dry Autumn, the next Year there is Plenty of fine Grapes, let the Seaſon of that Year be what it will: and as this is plainly the Caſe in theſe Shrubs, it doubly holds in reſpect of other Trees which grow in looſe Soils, and bear irregularly. I am perſuaded from what I have ſeen of the Beech, that its bearing Years are influenced by the preceeding Seaſon, and may be foreknown accordingly; but what I have collected from my Obſervations on this Head, is not yet enough to form a Syſtem.

After the Uſes of the Fruit, let us enquire into thoſe of the Wood of the Beech. In its ſmaller State, the Branches, as well as the worſt Pieces of the Timber cleft, make a bright, clear, and pleaſant Fire. The ſmall Wood makes excellent Charcoal, and the Aſhes are prefer'd to many other Kinds for uſing in the making of Glaſs. Turners uſe a great deal of the well grain'd Beech in Inſtruments, for it cuts eaſy, and is capable of a good poliſh.

The large Timber is uſed in many Kinds of Work. It will ſtand excellently in Water, where it is always wet, but it will not do where it is wet and dry at Times. The Evenneſs of its Grain, and its not being liable to ſplit, recommend it greatly to the Joiners and Cabinet Makers. Our Bedſteads in general are made of Beech; and it is the common Groundwork of thoſe Pieces of Furniture which are inlaid with Mahogany, Roſewood, or other expenſive Kinds.

It makes good Buckets, Trays, and other Utenſils, as Trenchers, and the like, being eaſily kept clean, and looking very pretty when ſo: and not being ſo liable to crack as many other Woods.

There is another Uſe which makes a large Demand for good Beech, which is the ſpliting it into thoſe thin Boards of which Ban-boxes, Hat-boxes, and ſuch other light Things are made. Theſe are all in general made of the Beech, becauſe no Wood ſplits ſo fine, or holds ſo well together. The ſplitting it for this Uſe is a very pretty Operation, it was invented abroad, and when the Knowledge of it got into England, was for ſome time kept a great Secret.

The ſhavings of Beech are bought up by the Wine Coopers, being uſeful in the fining of Wines, and they are a very innocent Ingredient; which cannot be ſaid of all that are uſed in London for that Purpoſe.

The beſt and fineſt Beech in England grows in Hampshire, from whence great Quantities are ſent up annually to London; it there is planted generally on a dry ſtony Soil, and in high Situations.

The Beech would be a very proper, and a very beautiful Tree for long Walks and Avenues, where the Soil and Situation are proper, for no Tree makes a more beautiful Appearance, or affords a finer or more wholeſome Shade, it is therefore a Wonder 'tis not more cultivated in general throughout the Kingdom.

CHAP. XXXI.

Of the white Poplar, its Soil and Situation.

WE have in England four diſtinct Kinds of Poplar, though ſome of them are called by other Names. In this Chapter we ſhall treat of two of thoſe four, which are nearly of kin to one another, and are too often confounded together. Theſe are the white Poplar, and that Kind called the Abele, for theſe may very fitly be conſider'd as two white Poplars; the other two Kinds are the black Poplar, and the aſpen Tree, which differ conſiderably from theſe, and from one another.

The white Poplar is a large and beautiful Tree, of an upright and ſtately Growth. The Leaves are ſhort, broad, and pointed at the Ends. The Flowers grow on ſome Trees, and the Fruits on others, whence the Poplars of all the Species are properly enough diſtinguiſh'd into Male and Female Trees. Theſe Flowers, which grow on thoſe called Male Trees, are compoſed of ſeveral little Leaves, and a great Quantity of ſhort Threads; and the Fruit which grows upon the others called Female Trees, is a Sort of Pod of a thin membranaceous Subſtance, which, when ripe, ſeparates into two Parts, containing the Seeds of the Tree lodged among a Quantity of ſoft downy Matter of the Nature of Cotton.

Theſe Characters agree equally with the two Species of white Poplar. The Difference between them is, that the Kind commonly called the white Poplar, has ſmall Leaves, and a rough Bark toward the Bottom of the Trunk; whereas the other called the Abele, has larger Leaves, and the Bark is ſmooth uſually all the Way up.

Theſe two Kinds are nearly equal in Value, and therefore it is beſt to plant the Abele, becauſe it ſomewhat excels the common white Poplar in Beauty.

The proper Soil for the Abele is a moiſt rich Ground, and it ſucceeds beſt in a flat and low Situation. They are excellent where there is Plenty of Moiſture; and will grow to great Advantage in many ſuch Places, where no other Trees can thrive; and, in ſome, where nothing elſe will grow.

It is not a great while that we have got into a Way of planting this Tree in England; we learnt it from Flanders, where Nurſeries of Poplar are as common as of Elms with us; and 'tis to be hoped a Practice ſo profitable will become univerſal for many an Eſtate may be prodigiouſly improved by planting boggy Places with this Tree.

The Willow is at preſent almoſt the only Fen Tree. But the Poplar will thrive in moſt Places when that ſucceeds, and is a much more profitable Growth to the Owner.

Nothing is more wanted in England than a general

general Knowledge of the Nature of Timber Trees, which would at once encourage the Taſte for planting, and make it ſucceſsful. Few turn their Thoughts to it; and of thoſe who do ſo, the moſt ſeem not to know that there are above three or four Timber Trees in the Kingdom. Their Thoughts are all directed to the Oak, Aſh, and Elm, or ſometimes, but very rarely, they take in the Beech; and if one or other of theſe will not do, the Ground is declared not fit for planting.

Not one of theſe four will grow on the rotten Soil of a Fen, but the Abele will flouriſh there, and will yield the Owners a vaſt Profit; and this on Grounds which he has never made any Uſe of at all.

There is a farther Conſideration which ſhould induce them to planting it, which is, the Quickneſs of the Growth of this Tree, in which it exceeds almoſt all others.

A great Objection to planting is the Length of Time requir'd to reap its Benefits; People are unwilling to labour for Poſterity: but in Plantations of the Abele they will work for themſelves, a very few Years raiſes vaſt Trees of this Kind, and there is a ready Market.

A Man muſt not look for the full Advantage from an Oak Plantation in his own Life, and for that of an Aſh or other quick-growing Tree, as they are called, he muſt wait forty Years; but when the Abele is the Tree, eight or ten Years raiſe it to a very profitable Bigneſs, and it arrives at its full Growth in leſs than twenty on a proper Soil, and ought to be then fell'd, and a young Plantation prepared to ſucceed the old one.

Not only the Profit ariſing from ſuch a Plantation, but the Beauty and Ornament it affords, which are very great, ſpeak for its being fell'd at a proper Time, which in general is about the Age I have named: for after this the Trees grow knotty and unhandſome; and every Year decreaſe in the Value of the Timber, which conſiſts greatly in the Evenneſs of the Grain.

The Abele makes a very beautiful Avenue to an Houſe in a proper Situation; and even the Trees, in this Caſe, ſhould be fell'd at their full Growth, others having been planted between to ſucceed them. Their Roots ſhould alſo be ſtub'd up, to favour the Growth of the new Plantation; and in this eaſy working Ground their Value, as Fuel, will pay the Expence of taking them up. An Avenue of them may be thus kept up from Generation to Generation, and always in Vigour, whereas, otherwiſe, they would ſoon grow deformed.

But though the Abele, or white Poplar, is very proper for an Avenue, it muſt not be planted near a Garden, becauſe, in that Caſe, it would have all the Inconveniences of the Elm and Aſh together, and more of its own. Its Roots would ſpread over the Garden Ground like the Aſh, and rob every thing of Nouriſhment: they would ſend up Suckers every where like the Elm, and ſpoil both Graſs and Gravel; and beſide this the downy Matter about their Seeds will cover the Place with a Litter that is very difficultly removed, for many Months together.

CHAP. XXXII.

Of the Propagation and Uſes of the white Poplar.

THESE Trees may be rais'd from Seed, if any one ſhould fancy ſuch an Undertaking, but it is altogether needleſs, as they are to be had ſo many other Ways, with ſo much leſs Trouble.

They are to be propagated either by Layers or Cuttings of any Kind; or by Suckers drawn up from about the old Trees; or by Stakes, which being planted in a right Soil, will take Root as freely as a Willow Stick, and grow to a vaſt Bigneſs in a ſhort Time.

Of theſe ſeveral Ways I would adviſe that by Layers, which will always afford the evenneſt and moſt beautiful Trees; and theſe take Root ſo eaſily, and bear tranſplanting ſo well, that it is pity to uſe any other Method in general. However, when a Man intends to raiſe only a few, he may be content with Suckers; and when he is in great Haſte to have a good Shade, he may uſe the other Method by Stakes, for they ſhoot up quickeſt of all, though they make the leaſt beautiful Trees.

When Suckers are uſed they are beſt taken up in the Middle of October, and being then planted in the Places where they are to ſtand, they will quickly arrive at a good Heighth.

But if this be not quick enough, and the Method of Stakes be prefer'd, let them be cut at about ſix Foot Length, and of the Thickneſs of a Child's Wriſt. Theſe are to be ſtruck off by one ſloping Blow at the Bottom, and thruſt fifteen Inches deep into the Ground, and no farther Care need be taken of them.

But to raiſe the Abele regularly, the Way is by Layers. To this Purpoſe the Stools muſt be planted in a rich and moiſt Ground, and treated exactly in the ſame Way as the Elm Stools for Layers, deſcribed under that Head. Theſe will yield a continual Supply of beautiful and well growing Plants, which being removed carefully into the Place where they are to remain, will, in half a dozen Years, be thirty Foot high, and as thick as a Child's Waiſt; they will ſometimes ſhoot nine Foot in a Seaſon.

The Quickneſs of Growth, and great Beauty of this Tree, are ſufficient Recommendations to thoſe who want quick Pleaſure or quick Profit. And the Uſes of the Wood are many. Indeed they are not ſufficiently known, nor is its Value.

In the firſt Place, no Wood whatſoever requires ſo little ſeaſoning, for none ſhrinks ſo little: nor is any Wood whatever leſs affected by the Weather. All Kinds of Timber will ſwell and ſhrink with the different Heat and Cold, and Moiſture and Dryneſs of the Air, but none ſo little as the Wood of the Abele, or broad-leav'd white Poplar; for this Reaſon it is very fit for many Uſes about Houſes, to which alſo the Whiteneſs of the Timber, and beautiful Grain greatly recommend it, though it be deficient in Hardneſs. What could be prettier than to ſee the Floors and Wainſcot of a neat Country Houſe of this Wood, which would have the great Advantage

tage never to ſhrink or ſwell, and would be kept clean and beautiful without Paint.

But not to dwell upon the Uſes to which it might be put, let us mention thoſe to which it is. The Wood of the Abele is excellent for Turnery Ware, nothing works more eaſily and freely, nor does any thing anſwer better for the ſeveral Kinds of Diſhes, Bowls, and other wooden Veſſels. A large Quantity of it is uſed by the Bellows-makers; and it is the Wood of which Shoe-heels are commonly made, which it is extremely fitted for, becauſe it is light and tough.

Its Lightneſs makes it alſo ſupply the Place of Cork, on many Occaſions, as for the floating of Nets, and the like Purpoſes. And where a great deal of Strength is not required, it has the Advantage of many other Kinds of Timber for making Carts and other Country Carriages, becauſe of its Lightneſs.

The Loppings are tolerable Fire Wood, and the Poles that grow up ſtrait and regular ſerve for the Hop Planters and Gardiners, on a great Variety of Occaſions.

Where Birch is ſcarce they ſometimes make Brooms of white Poplar Twigs, but for this Service the black Poplar, or Aſpen Twigs, are more proper, becauſe longer and tougher.

CHAP. XXXIII.

Of the black Poplar.

THE black Poplar is altogether like the white in its Flowers and Fruit, which grow on different Trees of the ſame Species: but the Quantity of white downy Matter in the Fruit of the black Poplar, is more than in any other Kind, from whence ignorant People have call'd it the Cotton Tree. The Leaves are ſmaller and rounder than thoſe of the Abele, and they are of a dark ſhining Colour, and its Twigs are of a deeper Hue, and longer, ſlenderer, and of a tougher Subſtance.

The black Poplar loves a rich and moiſt Soil, as well as the white, but it will bear a little dryer Ground; and will thrive on more expoſed Situations. For this Reaſon the Planter ſhould make his Choice of the Kind, when he intends to raiſe Poplar Trees, according to the exact Situation and Condition of the Ground. Where that is low, rich, and moiſt, it is indifferent which he chuſes; but where it is either altogether, or in any Part, a little higher, or a little leſs damp, he muſt prefer the black. The Trees are ſo much alike in their Growth and Appearance, that they may be planted together, with this little Diſtinction, of giving the loweſt Places to the white, and the higher to the black; and it will never be regarded in the Regularity or Appearance.

From what I have ſeen, the white Poplar, or Abele, in general, will do beſt on the Fens, and the black Poplar on thoſe Bogs which lie between or upon Hills; for this bears the Expoſure better. But then, as theſe Bogs are often wetter than the Fens, this is a Caution to be obſerved, that the black Poplars ſhould be planted about the Skirts and Edges of the Bog, and then the white and Abele may be planted in the Middle, where there is Firmneſs enough to ſupport them, for they will thrive very well there, under the Shelter of the others.

In many Places the Bogs between Hills are too wet and ſoft to ſupport the Roots of any Tree, if not qualified firſt by a little draining, which may uſually be done at a very ſlight Expence.

The black Poplar may be propagated by any of the Ways laid down for the raiſing of the white; but the Method by Layers is preferable to any other: and indeed in this Kind it is ſo far the more proper, as this will not always take Root ſo freely as the white.

The Method of planting the white by Stakes does very well, but it will not do for the black, at leaſt not conſtantly, for they frequently miſcarry.

But for thoſe who will not be at the Trouble of a Nurſery for the raiſing Layers, the Suckers may be taken up from about the Roots of the old Trees; and in want of theſe, very good Trees may be rais'd by planting ſmall Cuttings, only theſe require a little more Care, and ſhould be ſhaded at firſt. Theſe Cuttings ſhould be eighteen Inches long, and planted a Foot deep in the Ground; and thus they riſe to fine regular Trees.

The Timber of the black Poplar is very like that of the white, but ſomewhat firmer. The Turners prefer that of the Abele to all the other Kinds, which they diſtinguiſh by its whiter Colour, and more even Grain; the common white Poplar they eſteem next to that, and the black laſt: but the Difference is not great; and for Things of any Size, or where ſome Degree of Strength is required, the black is to be prefer'd to either of the others. They make Wheelbarrows and light Carriages of it in Flanders, where it is more common, and they laſt very well, and none are ſo light except of the other Kinds of Poplar which have not ſufficient Strength, unleſs worked up in a particular Manner, and with a much larger Quantity of Timber, ſo that they loſe one Way what they get another.

The Wood of both the black and white Poplar are uſed by the Carvers, but they prefer the black for the niceſt Works.

CHAP. XXXIV.

Of the Aſpen Tree.

THE Aſpen Tree is a kind of Poplar, and is call'd by thoſe Authors who write on Trees, the Poplar with trembling Leaves. It reſembles the Poplars in the Flowers and the Fruit; but its Leaves are rounder, and they ſtand on long, weak, and ſlender Foot Stalks. This is the Reaſon of their trembling Motion which they have, in a great Degree, with every Wind, and which makes them agreeable in the View of Buildings. There is ſomething ſo pretty in this Tree, upon the whole, that one is ſurpriſed it is not rais'd more frequently for Ornament. But 'tis left to the Woods, and rarely ſeen elſewhere.

The leaſt Wind ſets the Aſpen Leaves in Motion, and as they grow very thick upon the Tree, they rattle gently againſt one another, and the Noiſe is ſo like that of a diſtant Waterfall, that it would be taken for nothing elſe by any body who had not been accuſtomed to ſee what it was.

If we add to this its quick Growth, in which it reſembles the other Poplars, though it does not quite equal them; its regular Appearance, when kept in tolerable Order, and the Value of its Timber, one would think it ſhould be enough to recommend it to the Curious in theſe Matters, and that it may no longer be left a neglected Tree.

The natural Soil of the Aſpen Tree is a rich and moiſt Earth, and it thrives beſt in flat and level Places; but tho' one of the watery Trees it is not ſo ſtrictly as ſome others confined to that Situation, or Soil, for it will ſucceed tolerably on higher Grounds, and where there does not appear any particular Dampneſs. I have obſerv'd, however, that when it thrives in theſe Places, there uſually is a Clay at Bottom. I have mark'd its favourite Soil in high Grounds, and found that to be almoſt univerſally a rich loamy Earth, with a clayey Bottom.

In ſuch Places the Huſbandman may plant the Aſpen with a fair Proſpect of Advantage; and in low Places that are not too wet, he will never be diſappointed of its thriving quickly. It attains its Growth ſooner in theſe low Situations, but the Timber is better when it has grown on higher Grounds. But this Tree is never to be raiſed on Gravel, Sand or Chalk, for it will make no Progreſs, nor will the Wood be good.

The Aſpen is beſt propagated by Layers, which take Root very readily, and a ſufficient Supply whereof may be had from a few Stools, as directed under the Article Elm. But for ſuch as want only a few Trees, 'tis not worth while to wait this Time, and they may therefore raiſe them from Suckers, which riſe every where in Plenty about the old Trees.

Theſe ſhould be taken up in the Middle of February, and planted immediately.

They will ſtand very well in Rows, Avenues, or Clumps; and may be planted in proper Soils in Hedge Rows; for their dripping is not ſo hurtful as that of many other Trees. They alſo are a very good Addition to Coppice Woods; but whether in thoſe or whatever other Places they are planted, they ſhould be trim'd up for Trees, not cut for ſmall Wood, or lop'd for Pollards; for they do not yield a good Fire Wood, the young Shoots being too ſpungy.

This is a Fault alſo of the black Poplar, and of the common white Poplar: the Abele is the beſt of all the Claſs for Fire Wood, and that but indifferent.

When the Aſpen is firſt planted, the Side Shoots muſt for this Reaſon be trim'd off, and the Tree rais'd with a naked Trunk; its Timber Part will then grow apace, and the Head will be large and beautiful.

The Aſpen is not quite ſo ſpeedy in its Growth as the other Poplars, but it riſes ſufficiently quick into a fine Tree. From five and twenty to two or three and thirty Years may be allowed, according to the Differences of the Soil, for the Time of its growing to a full Maturity.

It is to be felled in the End of November, and the Timber is fit for many Uſes. It is called for in ſome Places by the Builder, and anſwers very well in Beams and Boards: in general where it is moſt known, it is the moſt valued, for there are many of our Counties where it is only ſeen here and there a Tree, and gazed at for a Rarity, becauſe of the Motion of its Leaves with the Wind.

Chair Frames and Tables are made of it in many Places; and in ſome it is ſplit into Pales for Parks, and Laths for Malt Kilns; for all which Purpoſes it is very fit. The Turners alſo uſe it for Bowls and Diſhes. In ſome Places Trenchers are turn'd of it, but it is not ſo fit for this Uſe as many other Woods: it is white and light, but the Grain is too looſe.

In ſome Counties they cut it off for ſmall Wood, among the other Coppice Kinds, but it is where they don't underſtand its Management. Its principal Uſes, when of this Size, are for Hoops, for Fuel, and for burning into Charcoal, but it does not anſwer well to any of them, for the Hoops are too brittle; and, as to firing, it ſmothers and ſmoaks, and the Charcoal made of it is but poor.

We name this ſo freely, that the Huſbandman may not be miſled by ſuch Writers, as copying one another inſtead of conſulting Experience, ſet down theſe for the Uſes of the Aſpen Wood. A Man who ſhould find it unfit for theſe, and take it upon truſt from them that it would do for no others, might give up the Intent of planting it, but tho' it is not ſerviceable for theſe Purpoſes, Experience ſhews it is for others.

CHAP. XXXV.

Of the Sycamore.

THE Tree which we commonly call the Sycamore, is of the maple Kind, and has been much more properly named the great Maple, but in general it is not known by any other Name than Sycamore.

It is a large ſtately and fair growing Tree. The Bark is tolerably ſmooth, and of a duſky brown. The Wood is ſoft and whitiſh; the Leaves are very large and beautiful, they are broad and divided in a pretty Manner at the Edges, the Flowers are thready and inconſiderable; the Fruit is like the Aſhen Key, but larger, and makes a pretty Appearance. Upon the whole, few Trees are better calculated for ornamental planting; ſo that 'tis ſtrange it is not more generally uſed.

The natural Soil of the Sycamore is a rich but light Mould, where there is ſome Degree of Moiſture, but it is not confined ſtrictly to ſuch: It will grow on almoſt any Land. We have in many Parts of England, Inſtances of its ſucceeding on gravelly and ſtony Grounds; but beſt when there is Water near.

The beſt Situation for the Sycamore is a Flat, becauſe it loves Water; but it will grow on Hills, and it has one particular Advantage, that it will bear to be planted near the Sea, where ſcarce any other Tree will grow. It bears the Spray very well itſelf, and by its Breadth of Leaf, excellently defends any other Trees from it in the Summer; and 'tis of ſo quick Growth, that its Body and Arms ſoon become qualified to do the ſame Service in Winter.

This is a Thing worthy the Planters very particular Notice, becauſe he has by this Means not only a Tree that will ſucceed, where otherwiſe he could make no Plantation; but it will defend a Plantation of any other Kind under the ſame Diſadvantage.

The Sycamore may be raiſed either from Seed, or by Layers, or Suckers. The firſt is greatly the beſt Method, and this ſucceeds moſt happily of all, when the Trees are ſown on the very Spot where they are to ſtand: but it does very well either of the other Ways; the Layers are produced from the Stools in great Abundance, and root eaſily; and the Suckers alſo grow readily: but the Trees raiſed from the laſt are uſually inferior to the others in Beauty.

The Seeds are produced every Year in great Abundance. They ripen about October, and are to be ſown immediately after in good Earth. If they are raiſed for Removal, they ſhould be ſown in Trenches three Inches deep, drawn at ſmall Diſtances; if on the Places where they are to ſtand, half a dozen Keys are to be laid in a Hole dug for that Purpoſe, and cover'd three Inches deep with Mould. They ſhoot up the next Spring, and grow very quickly.

If they are thus ſown in a Nurſery, they muſt be removed the next October into another Part, and planted at a Foot Diſtance, in Rows two Foot and a half aſunder: after two Years Growth in theſe, they may be planted where they are to ſtand.

Whether it be raiſed from Seeds, or Layers, or Suckers, the Side Branches are to be trim'd off for the three or four Years ſucceeding the laſt Tranſplantation; and after that they may be left to Nature. The ſame Method is to be obſerv'd with thoſe raiſed on the Spots where they are to ſtand. Of the half Dozen that ſpring up in each Hole, only one is to ſtand; the others are to be pulled up one by one at different Times, and the fineſt left. This is to be trim'd up that it may grow to a Body. And if theſe Holes are dug at five and twenty Foot Diſtance in a double or treble Row, there will in a very few Years be a beautiful Plantation.

The Gardeners keep a Sycamore with Leaves ſtrip'd with yellow, and this has ſomewhat ſingular in it, that the Tree bears its Fruit very regularly, and if its Keys are ſown, they always produced ſtrip'd Trees, which is not the Caſe with the Generality of theſe artificial Beauties, they requiring to be budded or grafted; their own Seed generally raiſing a plain leav'd Kind.

The Sycamore is not one of thoſe Trees that produces a good ſmall Wood, nor indeed do any of the ſoft Kinds, it is for that Reaſon we have adviſed the raiſing it always with a trim'd Trunk for Timber. The ſmall Wood does not burn well: but the Timber has many, and thoſe very conſiderable Uſes.

The beſt Time for felling the Sycamore is in the Beginning of December; and 'tis always uſeful to have a freſh Stock of Trees raiſing between the old ones, that may thrive and grow up when they are gone. This is an eaſy Method, and ſhould be practiſed in all quick growing Trees.

The Shade and Shelter of the Sycamore is excellent; and as it will bear the Miſchiefs of the Sea, it will alſo reſiſt the ſtrongeſt Winds, ſo that no Tree is equal to it for the ſheltering other Plantations. In ſome Places we ſee them in Hedge Rows, but rarely, though wherever it is ſeen 'tis counted a great Beauty. The only Part of England where it is common, is the Biſhoprick of Durham, where they have from Time immemorial been uſed to it, and plant it in Hedges, Walks, and about Houſes in great Abundance.

When the Soil and all Things ſuit, it will grow to a vaſt Size. Trees of five, ſix, or ſeven Foot in Diameter are not uncommon, and at this Bigneſs frequently found throughout. It reaches this Size alſo much quicker than the Generality of Trees: for in the common Courſe of Nature, thoſe Trees whoſe Wood is ſoft, arrive at their Bigneſs ſooner than thoſe the Wood of which is harder.

The Timber is white, and of a beautiful Grain. It is uſed very much by the Turners, they make of it wooden Platters, Bowls and Trenchers, Spoons, Ladles, and other of the ſmall Utenſils of the Kitchen. Some have uſed it in the Inſide-work of Houſes; it is not very ſtrong, but it ſhrinks little.

The Sycamore may be tranſplanted when very large, only that too much Head muſt not in that Caſe be left on: but it ſoon recovers the Loſs by the Axe, growing from an old Trunk, when once rooted, very freely. When the Head or large Branches are lop'd on this or any other Occaſion, the wounded Place muſt be cover'd over with a Cap of Lead, or Oil Cloth; or elſe with a Mixture of Clay and Dung, otherwiſe it very eaſily lets in Wet to the utter Deſtruction of the Tree.

The Sycamore is a Tree Bees are very fond of, and it is of great Uſe to them; for it is oftener cover'd with a Honey Dew than any other Tree whatſoever. For this Reaſon alſo it is frequently over-run with Inſects of many Kinds; for this Honey Dew is their Food, and where the Food is they will be found.

CHAP. XXXVI.

Of the Lime Tree.

THE Lime is a large, and naturally, a well growing Tree. 'Tis often injur'd by cutting into fooliſh Forms, but in its own Growth it is very beautiful. The Bark is brown and tolerably ſmooth, the Wood light and fine: the Leaves are broad and roundiſh, but that they

they end in a point. The Flowers are of a pale whitiſh Colour: each is compos'd of ſeveral Leaves which ſtand hollow. There is a longiſh Leaf on the Stalk of each Bunch of Flowers, and the Fruit is a ſmall double Seed Veſſel of a teſticulated Shape.

There are three Kinds of the Lime Tree cultivated here. 1. That with larger Leaves called the common Lime. 2. The ſmall leav'd Lime; and, 3. That with red Twigs. The Leaves of this laſt Kind are a little hairy, and the Fruit is ſquare. There is alſo a ſtrip'd Lime Tree common in the Nurſeries, but it is no other than the common Lime alter'd by Art; and there are ſome others not worth the Planters Notice.

The beſt Soil for the Lime Tree is a good rich loamy Earth, where there is Depth and Room for the Roots to ſpread. But it will grow in others. Too much Moiſture is an Enemy to it, and ſo is exceſſive Dryneſs. Where the Soil is a cold Clay, apt to detain Water a great while, the Lime ſhould not be planted; for the Wet always chills, and frequently rots the Roots. Where there is a poor Gravel, or a very ſtony Land, it is not fit for the Lime. But in a Gravel with a good Mixture of loamy Earth, ſuch as are the beſt of the gravelly Soils in Buckinghamshire, and elſewhere, it thrives very well.

This Particularity with reſpect to the Soil for the Lime, is the more needful to be obſerved, becauſe its Bulk depends upon it: and it is for this Reaſon that few now grow to a proper Maturity.

In ſandy Soils the Leaves of the Lime come out a Fortnight ſooner than in others; and in wet, clayey and cold Lands, they fall two Months before their Time. This may be a Mark to the Planter, whether the Soil ſuits the Tree. For the too great Forwardneſs of the Leaves is as bad a Token as their too early Decay.

In ſuch Soils the Lime will live without flouriſhing; and thoſe who have ſeen it only in ſuch, will not know what may be its Value. The Lime, in a favourable Soil, will grow to ninety Foot in Height; and has been meaſured twelve, fourteen or ſixteen Yards round the Trunk, and entirely ſound.

'Tis not only here and there a Tree that thrives thus, whole Plantations riſe to ten Yards round with great Regularity; nor is the Lime one of thoſe ſlow growing Trees, that reſerve their Profits for another Generation.

The Huſbandman who knows this, will ſee what may be the Advantage of planting this Kind when he has a proper Soil. For, as the Timber is of ſome conſiderable Value, ſuch a Quantity as is contain'd in Trees of this Height and Bigneſs, is an Article very well worth his Regard.

The Lime loves a Situation ſomewhat raiſed. It will grow very well on Hills; but upon a ſmall Aſcent, with a due Depth of ſome free Soil, is the Place of its greateſt thriving.

It may be propagated three Ways, by Seed, by Suckers, or by Layers; but the laſt Method is much the beſt. If any one chuſe to raiſe it from Seed, he muſt gather his Seed carefully in the End of October, when it is fully ripe, and from a thriving Tree. This he is to lay up in Sand till February, and then ſow it in a Nurſery Bed, from whence the young Trees are to be removed the firſt Autumn into another Part of the Nurſery, and tranſplanted into their proper Places at four or five Years Growth.

Thoſe who want only a few Trees, may raiſe them from Suckers taken from the Roots of the old ones, chuſing the ſtraiteſt and beſt, and ſetting them at once where they are to ſtand; defending them by a Hedge, Pale, or Buſhes, till they have got a little Strength.

But the Way I adviſe is to raiſe them from Layers, as directed under the Article Elm. The Stool muſt be planted in a deep light Soil. The Shoots are to be laid down in September; and the September following they muſt be removed into Beds four Foot diſtant in the Rows, and two Foot from one another. They are to ſtand in theſe Beds four Years, and then to be removed to the Places where they are to ſtand, after which they require little or no farther Care.

While they ſtand in the Nurſery it will be well to dig up the Ground every Spring between the Rows, and to take off all the large Side Shoots, leaving only the ſmall ones to detain the Sap.

There is little Difference in the Timber of the three Kinds of Lime Tree. The ſmall leav'd Sort yields ſomewhat the hardeſt Wood: the other two ſhew ſcarce any Difference. They bear more Moiſture, and a lower Situation, than the ſmall leav'd one; and by this the Planter may be directed in the Choice of his Kind, ſuiting it exactly to the particular Nature of his Ground.

The Lime may be tranſplanted at a very large Size, by taking it up with a Ball of Earth about the Root; but to enſure the Succeſs, the Head ſhould be cut off. In this Caſe leſs Care and Trouble are requir'd in the doing it. The wounded Part in theſe Tranſplantings, muſt be well ſecured by a Covering of Clay and Dung, or in ſome other Manner as has been before directed, and there is then no Fear of Hurt.

The Beauty and free Growth of the Lime have recommended it greatly for Walks and Avenues; and the Fragrance of its Flowers is a great Conſideration in its Favour, but the Leaves decay ſo ſoon that many are diſpleaſed with it. 'Tis one of the firſt Trees that puts us in mind of the Approach of Winter, and in a diſagreeable Soil much ſooner than in others. Its Leaves will ſometimes fall in the End of August, ſo that it is a Month or five Weeks ſooner than the Generality of our other Trees. This diſagreeable Circumſtance, together with the Dirt and Litter ſuch a Number of Leaves make, diſguſts People very much, and has baniſh'd it from many Gardens; but, in a proper Soil, the Planter will not find the Advantage leſs, becauſe it wants ſomething in the Article of Pleaſure. And to anſwer thoſe Diſadvantages that have been named, it has two Benefits in which few Trees excel it: ſcarce any Tree bears the Fury of the Winds better, or is leſs liable

liable to ordinary Accidents; and it is very little apt to grow hollow.

In many Plantations of ſome ſtanding, one ſees the Elms ſhatter'd by Winds, and decay'd within; while the Limes in the ſame Place, tho' they have grown longer than was needful for Profit, are entire, ſound and flouriſhing, though expoſed to all the ſame Accidents.

The Wood of the Lime is light, and of a good Grain, not liable to ſplit. It cuts eaſily, and is excellent for Carvers. It is the common Wood uſed in making of Models; and the Turners make a great deal of their Ware with it. The Farmer and Huſbandman prefer it to others for many of their Implements, as it is very light, and yet of ſufficient Strength: and 'tis fit for paling, and the other common Uſes of Timber.

The Gun Powder Makers are very fond of the Coal of the Lime Tree, they always uſe that of ſome light Wood, frequently the Alder, ſometimes the Willow, but none anſwers ſo well as the Lime, becauſe a well-burnt Piece of fine Charcoal has the Qualities of the Wood, and is light and ſtrong both.

CHAP. XXXVII.

Of the Walnut Tree.

THE Walnut Tree may be conſider'd by the Gardener on account of its Fruit, but the Value of its Timber gives it a Title to ſtand among our Liſt of Trees raiſed for that Purpoſe, ſince it will be very well worth the Huſbandman's while to plant it, independently of any other Conſideration. The Quantity, as well as the Price of the Timber, is a very great Article in this Account.

It is a large ſpreading and beautiful Tree. The Leaves are each compoſed of ſeveral others ſtanding on the two Sides of a middle Rib, with an odd one at the End. The Bark is of a pale brown, and ſmooth; the Wood firm and beautifully vein'd. The Flowers are little and inconſiderable, they hang in Strings, and are compoſed of ſome Threads and chaffy Leaves: the Fruit in the Walnut, conſiſting of a green ill-taſted Rind, a hard Shell, and within all the Kernel cover'd with a thin Membrane. This Fruit does not follow the Flower in its Place, but grows on another Part of the Tree. This is a Courſe taken by Nature, very frequently in Trees, but more rarely in Herbs, though we ſee Inſtances of it familiar enough.

Thoſe who write on theſe Subjects, mention ſix or eight Kinds of Walnut, and diſtinguiſh the Trees that bear them by ſo many diſtinct long Names, but theſe are only Variations made by Culture; and the Planter who conſiders Timber more than Fruit, needs not regard them. There is in Reality but one Kind of Walnut Tree common in England, and that is the ſame, whether the Fruit be ſmaller or larger, and whether it have a thicker or a thinner Shell. There have of late Years been ſome diſtinct Kinds brought from America, under the Name of Hickery, but though the Nurſerymen raiſe theſe, the Planter has nothing to do with them. If they be equal to the common Walnut Tree in the Timber, they want the Advantage of the Fruit, for theirs is of no Value; and this, though a trifling Conſideration, yet need not be altogether neglected.

There are ſome who prefer the Hickery Wood to our Walnut Tree; but if they are fairly compared together, the English Walnut will be found to have the Preference. The Wood of the Hickery or American Walnut, and eſpecially of the black Kind, is harder than our Walnut, but it has not the Toughneſs: it is often beautifully vein'd alſo, but not comparably to the fineſt of our English Walnut.

The Kind called by our People, the ſmall white Hickery, has the Advantage of quick Growth; but then the Wood is not equal to that of the other Kinds.

I have judged it needful to enter thus far into the Difference of theſe ſeveral Kinds of Trees, to prevent the Huſbandman who intends planting, from being deceived by ſuch as are half acquainted with them, and are always more poſitive than ſuch as have ſearched deeper. He may be told that the Virginian Walnut is a quicker growing Tree, and has a harder Wood than the English, and that may tempt him to plant it in Preference; to his great Loſs. 'Tis fit therefore he ſhould be inform'd, that it is one Kind of this foreign Walnut that is of quicker Growth than ours, and another that has harder Wood: as alſo, that he would never be able to ſell either of the Timbers for English Walnut-tree, to an experienced Cabinet-maker; or to get nearly the Price for them that he may have for the other.

The Walnut Tree thrives very well in a dry Soil, and will bear a gravelly or ſtony one without languiſhing, but its favourite Earth is a deep and rich Loam. We have ſome Grounds in Surrey, where there lies at ſix or ſeven Foot deep, a Bed of a chalky Marle. There are Walnut Trees planted on theſe, and they thrive greatly.

Let the Huſbandman who is about to plant, ſearch after a light but firm Soil for his Walnut Trees. They will rarely deceive his Expectation any where, but it is on ſuch Lands as theſe that they will yield their full Advantage. A cold Clay is to be avoided; nor is the Walnut to be planted where there is too much Moiſture. Its own ſpreading Branches keep the Ground at all Times cool and damp about its Roots, and too much Wet does not evaporate well in ſuch ſhaded Places.

The Timber of Walnut Trees that have grown in a chalky Soil, or in a very light and ſandy Loam is found beſt; and that is always worſt which is yielded by Trees that have grown in the Way of too much Moiſture: this makes the Wood leſs firm, and hurts the Colour.

The proper Situation for the Walnut Tree is a little riſing; the Tops of Hills are too bleak; and the low and flat Grounds are apt to be too damp.

The Walnut ſhould be raiſed from Seed, that is, by ſowing the Nut; and it ſhould always be

ſown in the Place where it is to ſtand. The common Practice is to raiſe them in a Nurſery, and remove them at four or five Years Growth into their Places; but this is very prejudicial to the Planter. I am ſenſible that the Nurſery-men will all tell the Farmer that the Wallnut Trees are much better which have been removed, than thoſe which have always ſtood in the ſame Place: but he is to underſtand that there is a Difference in his Deſign from what the Nurſeryman intends. In the tranſplanting a Wallnut the long or tap Root muſt be cut, and this conſequently ſtops the upright Growth of the Tree, making it ſpread into a great Number of Branches at a ſmall Height; and ſuch Trees are beſt for bearing of Fruit, which is all the Nurſeryman thinks of: but it is the Intereſt of the Perſon who plants for Timber, to have the Tree riſe to ſome Height, with a good Trunk; and in order to this it muſt never be removed at all.

The Wallnut Tree ſhould ſtand in a Plantation at five and thirty Foot Diſtance, and may very well be ſet in two Rows forty Foot diſtant from one another. More will not do well, for they will rob each other of Nouriſhment.

When ſuch a Plantation is intended, let ſome good ſound Fruit of the common Wallnut, not the FRENCH, or the fine thin ſhell'd Kind, be collected with Care from a tall Tree, juſt when the green Rind begins to crack.

Let theſe be laid in a large Tub, with the Rind on, and with ſome dry Sand about them, till the next Spring.

In the Beginning of FEBRUARY let the Ground be mark'd out by Meaſure, for the Plantation, and a Hole of two Foot Diameter dug in the Place where each Tree is to ſtand. The Earth being well broken and put into the Hole again, let eight or ten Wallnuts, taken out of the Sand, be carefully ſet in it at equal Diſtances, with the green Rind on, and cover'd three Inches deep with Earth. Then let the Places be cover'd with a few Buſhes, and all left to Nature.

Wallnuts often miſcarry, but from the Number here directed to be ſet in each Hole, there will riſe three, four, or more Trees. Theſe are to be carefully taken up one by one, at different Times, till only one is left in each Spot, and that the moſt thriving and beſt looking Plant.

Great Caution muſt be us'd not to diſturb the Root of the Tree that is to ſtand, in the taking up of the others: they muſt be rais'd very gently; and the Earth cloſed about it when they are taken up, and a little ſprinkling of Water allowed for the ſetting of the Ground thoroughly about the ſmall Fibres.

When the Tree is left ſingle it muſt be defended from Accidents, by Buſhes planted round it, not by paling, as ſome do, for that hinders the free Courſe of the Air; and the Wallnut is found to require it more than any other Tree.

The Planter will remember that he raiſes his Tree for Timber, and that 'tis his Intereſt to carry it up in a good Trunk: but the Wallnut is particular in this alſo, that no Tree bears the Loſs of its Branches ſo ill.

Such Boughs as threaten to ſpread from a ſmall Height, muſt be carefully removed; and all the Care of this Kind muſt be taken while it is very young, for the taking off a Branch of any Bigneſs in the Walnut always endangers the Tree. If that ſhould ever be needful, it muſt be done juſt at the Fall of the Leaf, and the Branches muſt be cut off ſmooth and even, cloſe to the Body: after this the Trees are to be left to themſelves, and will ſoon yield a Profit from their Fruit, which will give the Planter Patience to wait for the Growth of the Timber.

It will be ſeen by the particular Treatment neceſſary for raiſing the Wallnut Tree for Timber, that no general Direction can ſerve for the Propagation of all Kinds of Trees. Each has its particular Nature, and demands more or leſs a particular Management. The Reader therefore will not call us tedious that we have delivered the Method of raiſing each ſeparate; or accuſe us of repeating the ſame Practices for the raiſing ſeveral Kinds, ſeeing thoſe Practices are only the ſame in generals; and vary altogether in the particular Inſtances.

It is neceſſary not only to lay down the right Methods, but to guard againſt the wrong. It is a common Practice in thoſe who raiſe Wallnut Trees from the Nut, to lay a ſquare Piece of Tile under the Nut they plant, at two or three Inches Depth. The Intent of this is to ſtop the great and ſtrait Root, and make it break and ſpread. This is right in the raiſing the Wallnut Tree for Fruit; but altogether wrong when it is intended for Timber, becauſe the long or tap Root, in that Caſe, is more uſeful than all the reſt, and is the very Thing that carries up the Trunk to a due Height.

We have obſerved that the Wallnut Tree for Timber ſhould be planted only in one or two Rows, and that at a due Diſtance: in this Caſe the Tree, being carry'd up to a proper Height in the Trunk, is to be left to ſpread as Nature directs; and never to be lopped. But if any one ſhall chuſe to ſet it among other Timber Trees in a Wood; it muſt be lopped up to a great Height, the Branches being taken off, as already directed, and thus it will fare like the reſt of the Shoots, and grow ſociably among them.

The Wallnut may alſo be planted in Tillage Ground, but at a great Diſtance. Wallnut Trees in Corn Lands ſtanding at a hundred and fifty Foot Diſtance do no Harm. Their Roots penetrate deep for Nouriſhment, ſo that they neither rob the Crop, nor lie in the Way of the Plow. They thrive excellently in theſe Places; the frequent Stirring of the Land contributing greatly to their Growth, and they are a Defence rather than an Injury to the Ground.

Wallnut Trees rais'd in the Manner here directed, ſerve excellently for Avenues, and in other regular Plantations: and when planted merely for Gain, on Grounds of little Value, they are beautiful as well as profitable. The largeſt Plantations of Wallnut Trees any where in ENGLAND, are in SURRY; and the Owners find ſo great Advantage in them, that they take Care to keep up a continual Supply for Deficiencies.

In theſe Plantations the Huſbandman is to take Care that the Soil be not ſandy underneath; and that the Situation do not expoſe them too much to cold Winds; with this Caution the Plantation will never fail, though according as the Soil is more

or leſs favourable, the Growth will be quicker or ſlower.

As the Fruit of theſe Trees, though rais'd for Timber, is not to be neglected, I ſhall caution the Farmer againſt a vulgar Error. 'Tis ſaid that the Wallnut Tree is the better for beating; and this is handed down from Generation to Generation, in Rhymes and Proverbs. But it is altogether falſe. As it would be tedious and difficult to gather Wallnuts by hand, People got into a Cuſtom of beating them off the Branches with Poles; and from the general Practice they came, at laſt, to think it was uſeful to the Tree: but this is altogether an Error. Though beating may be allowable for Convenience, it is not to be commended: and he who has a due Care of his Trees will do well to ſee it be done as gently as poſſible.

A great Quantity of Leaves are uſually beat down with the Fruit, and theſe had better be ſwept away than trampled into the Ground: for there is ſomething in the Juice of the Wallnut Leaf not favourable to the Soil. If, after theſe Leaves and broken ſmall Branches are ſwept away from under the Tree, ſome freſh Aſhes be ſcattered over the Ground, they will greatly aſſiſt both the Tree itſelf, and all that grows about it.

If any other Kind of Wallnut Tree be deſired for Variety in the Plantation, that which is called the black Virginian Kind is the beſt. It will do as well on our Soil as in its own native one: but it is a ſlow Grower, and the Fruit is of no Value. The Wood of this Kind is pretty, being moſtly black and white, but it is brittle.

The Wallnut Tree Timber ſo much valued in France, and called Grenoble Wood, from the Place where it is rais'd in the greateſt Quantity, is no other than the common Wallnut. It bears what we call the large French Wallnut for Fruit, but this does not, in any thing eſſential, differ from our common Kind.

The Time of felling the Wallnut is toward the End of November: and its Value depends ſo much upon the accidental Courſe of the Grain, that it is utterly impoſſible to make a Judgment of it till the Tree is cut down, and it can be ſeen. Wallnut Timber is always of a certain Price with its leaſt Beauty, but when the Grain runs fine it encreaſes the Value beyond Computation.

One thing I ſhall tell the Planter from many Obſervations, which is, that this veining of the Wood is uſually fineſt in the drieſt Soils, and in ſuch Trees as have been longeſt in attaining to their Size. There are Soils ſo dry that this Tree will not thrive in them at all, but where it will live Nature has made this Amends for the Tedioufneſs of the Growth.

The French uſe the Timber of the Wallnut in building, and for the largeſt Works: with us it is, in a Manner, confin'd to two or three Trades, who employ it in ſmaller Works. The Cabinet-makers conſume the greateſt Quantity, and take the fineſt Wood: they uſe it ſometimes ſolid, and often in enlayings. The Part which is not beautifully vein'd is uſed by Coachmakers for the Body of the Coach, as alſo for the Wheels in many Places; and the Stocks of Guns, and many other ſuch Things are made of it.

The fineſt grained Part of the Tree is always that which is neareſt the Root: but in general, where one Part is very good, the reſt has its Beauty, though in an inferior Degree. We ſometimes ſee the Wood brought from Virginia worked into ornamental Things at the Cabinet-makers, and when the Pieces are well choſen it is often very pretty.

When a Wallnut Tree is well grown it affords a great Quantity of Timber; and every Part of that is thus of certain Sale, though ſome at a larger Price than other; ſo that taking in the Benefit of the Fruit, which in this Conſideration is to be underſtood as an accidental Advantage, no Tree is more profitable.

CHAP. XXXVIII.

Of the Horſe Cheſnut Tree.

THE Horſe Cheſnut is cultivated more for its Statelyneſs and Beauty, than for the Value of its Timber: however, as it is a quick Grower, the Quantity will, in ſome Degree, make Amends for the Defect of Goodneſs; and as there are Places where it will thrive, that will ſcarce do for any other Trees, it may be worth the Huſbandman's while to be acquainted with it, that he may uſe it on proper Occaſions.

It is a large Tree, very regular in its Growth, and at its flowering Seaſon of uncommon Beauty. The Bark is of a deep brown and rough, the Wood ſoft and whitiſh. The Leaves ſtand ſeveral together at the End of a ſingle Foot Stalk, dividing like Fingers. The Flowers are white, with a bluſh of red, and grow in Spikes, the Fruit is contained in a prickly Huſk, and is large and brown.

The Nurſerymen raiſe Horſe Cheſnuts with ſtrip'd and blotch'd Leaves, white and yellow, but theſe are only Varieties of the common Kind. The Tree is a Native of the Eaſt, but it bears in our Climate perfectly well, and flouriſhes as if it were originally of our Growth.

The proper Soil of the Horſe Cheſnut is a light rich Earth; but it will grow in ſandy, gravelly, or ſtony Land; and particularly where there are large Beds of Sand underneath, which will not ſuffer other Trees to thrive. In theſe Places it will be profitable to plant the Horſe Cheſnut; and it will do whatſoever be the Situation; though its moſt favourite one is the Side of a Hill.

The Horſe Cheſnut may be propagated by Layers or Suckers, but it is much beſt to raiſe it from Seed. This may either be done in the Nurſery, or in the Places where it is to remain, but the latter is much the better Way. The Ground is to be marked out for this Purpoſe, and a Hole opened at every thirty Foot Diſtance: into theſe Holes, when fill'd up again with their own Earth, are to be put the Seeds, gathered in their State of Maturity, from a flouriſhing Tree. Four or five ſhould be put into each Hole at a Diſtance one from another, and when they have ſhot, the worſt Plants are to be removed, leaving only one at laſt to grow into a Tree. Theſe are to be trim'd up till the Boughs will be out of the

the Reach of Accidents, and then left to Nature. They uſually grow of themſelves very regular.

The quick Growth of the young Branches of this Tree has ſurpriſed many. At the ſhooting Seaſon they will all uniformly grow an Inch in a Day and Night: but this will appear the leſs wonderful, as we examine the Tree more ſtrictly: for we ſhall find that the whole Growth of a Year is performed in about eighteen or twenty Days at this Seaſon: all that is done afterwards being only the giving theſe young Shoots Strength and Firmneſs.

The Horſe Cheſnut, by its own natural Growth, becomes pyramidal, being largeſt at the Bottom, where the Branches begin, and ſmaller all the Way to the Top, but it does not terminate there in a ſharp but blunt Point.

As the Tree is thus regular in its Shoots, there is no Need of lopping to bring it into Form. The Time of felling it is during the whole Winter: but it is of little Value, more than for the Fire. In ſome Places they make the Implements of Huſbandry of its Timber; and if there were not Plenty of other Kinds, it would probably be more enquired after. The Branches make very good Faggots, and the Trunk cleaves into Billets, and it burns better than any other of the ſoft Woods: though not ſo well as the hard Kinds.

The Fruit has a pretty Appearance, but is of no Value: abroad they give them to Horſes and other Cattle in their Provender, partly as Food, and partly as a Medicine againſt Diſorders in their Lungs; but we pay no Regard to them, though there is no doubt of their being a wholeſome and good Nouriſhment.

CHAP. XXXIX.

Of the Cheſnut Tree.

THIS is a Tree very much ſuperior to the former in every Reſpect; the Timber being excellent for many Uſes, and the Fruit pleaſant and wholeſome. The other has been called by the ſame general Name of Cheſnut, becauſe of ſome Reſemblance of the Fruit in Colour and Shape, and in the outer Covering; but the Trees are altogether different in every other Reſpect.

It is a tolerably large, but not a beautiful growing Tree. In that Reſpect the Horſe Cheſnut has entirely the Advantage, as alſo in the Beauty of the Flowers: but the Leaves of this are very handſome, they are large, long, of a fine bright Green, and indented beautifully at the Edges: they ſtand ſingly, not ſeveral upon the ſame Stalk. The Bark of the Cheſnut Tree is brown and tolerably even, the Wood firm and dark coloured. The Flowers are ſmall and inconſiderable, they hang in Strings: the Fruit is the common Cheſnut which we eat: it grows upon a different Part of the Tree from the Flowers, and has a rough or prickly Huſk. Two or three Cheſnuts are contained in each Huſk.

There is but one Kind of this Tree that the Planter is to regard, but that is very worthy of his Notice, becauſe the Fruit is valuable as well as the Timber. Our Nurſerymen raiſe a ſmall Kind from Virginia, called the Chinquapin; and they ſtain the Leaves of the common Kind; but the little Sort is not worth planting, and the ſtrip'd Leaves of the other are only an accidental Variety.

It is a great Advantage in the Cheſnut Tree, that it will grow in almoſt any Soil or Situation, It naturally thrives beſt in a ſandy Loam, on the Side of an Hill, but it may be rais'd in gravelly, ſtony, or chalky Ground; and will ſtand the ſtrongeſt Winds in the higheſt Situation, for it roots very deep, and does not carry ſo tall and large an Head as many other Trees.

Too much Moiſture in a Soil will hurt the Growth of the Cheſnut; and it will much better bear a dry and harſh Land; but it will live almoſt any where; and bear great Quantities of Fruit in the worſt Land. Even wet is not an utter Enemy to the Cheſnut Tree, unleſs when it is detained about its Roots. A moiſt Gravel is a very favourite Soil for it: the clayey Bottom of a Soil that will not let Water run off, is the moſt deſtructive of this, and of other Trees that don't affect Moiſture, for it chills and rots their Roots.

The Cheſnut is to be rais'd from Seed; and the Fruit of this Tree ſo far enters into the Conſideration as an Article of Huſbandry, on this Occaſion, that a great Part of the Expectation of good Trees is founded on the Choice of it.

The Cheſnut ripens its Fruit very well in England, but the Planter ſhould not raiſe his Stock from theſe. We import yearly a great Quantity of Cheſnuts from Spain and Portugal, for the Service of the Table; and theſe are to be prefer'd greatly to thoſe of our own Growth for the ſetting for Trees.

Let the Perſon who intends to raiſe Cheſnuts purchaſe a Quantity of theſe at the Seaſon of their coming over, which is in Winter. Let him buy twice as many as he will have Occaſion to uſe; and lay them carefully up till Spring, in ſome Place where they will neither be too dry nor too moiſt, and where Vermine cannot come at them.

In the Beginning of February let him prepare to ſet them in the Ground. But in order to this let him examine his Parcel, by throwing them all into a Tub of Water. Part will ſink to the Bottom, and part will ſwim upon the Top of the Water. Thoſe which ſwim are naught, the others are ſound.

They may be rais'd either in Nurſeries, or in the Places where they are to ſtand. But as the Fruit is ſome Conſideration in this Tree; and the Timber is not ſo valuable as in ſome others, it may be as proper a Method to raiſe them in the Nurſery, and tranſplant them afterwards. In general, when the Timber only is regarded, and fine Timber bears a great Price, the beſt Method is to raiſe the Trees in their Places, but in thoſe which bear Fruit, it is as well to raiſe them in Nurſeries.

To this Purpoſe the Place for the Nurſery being choſen in a poor Ground, let Trenches be opened in the ſecond Week in February, four Inches deep, and ſix Inches aſunder. Let the Cheſnuts be planted regularly in theſe, one every

four Inches, with the Eye uppermoſt; and let the Earth be drawn over them.

Half a Dozen of theſe Trenches muſt be made, and then a Space left by way of Alley, to get between and clean them; and then another Bed of ſix Rows made as before; thus proceeding till ſuch a Quantity of Cheſnuts are planted as will ſerve for the intended Trees; and for a Supply to ſuch as may want in the Neighbourhood; for there are uſually ſome who will be glad to buy the young Trees at a ſmall Price, which takes off from the Expence of the Nurſery.

When the Cheſnuts are planted, Traps muſt be ſet all about the Ground for Vermin, elſe they are ſo delicious a Bait, that they are often devour'd.

They will appear above Ground in two Months, and they are then to be kept clear of Weeds, and to ſtand two Years. At the End of this Time the young Trees muſt be taken up and planted at two Foot Diſtance, in Rows a Yard aſunder. In this removing, the long tap Root is to be cut off; and Care taken not to injure the others.

The beſt Seaſon for tranſplanting them is early in March, and from this Time Care is to be taken of their growing upright and ſtrait, by trimming off the Side Shoots; or where they will ſpread too low, by cutting them off down near the Ground, taking Care to do it where there is a Bud. They will ſhoot up from this a ſingle ſtrait Shoot, and become fair and flouriſhing Trees.

After they have ſtood four Years in this ſecond Place, that is, when they are ſix Years old from the firſt ſowing, they may be removed into the Places where they are to remain.

The Cheſnut is a very good Tree for Avenues, for Clumps in Parks, and for many other Kinds of Plantations, where the Beauty of the Leaf, and Value of the Fruit are regarded. They may be ſet at about twenty Foot Diſtance, and will afford a conſiderable Quantity of Timber.

This is uſed by Joiners and Cabinet-makers. At one Time 'twas a Cuſtom to employ it in the Way of large Timber for Beams in Houſes. At preſent 'tis more uſed in ſmall Works, as for Tables, Bedſteads, Chairs and Cheſts; in which it makes a pretty Appearance.

In ſome Places they make Wine Caſks of it, and it is ſaid to give leſs Taſte to the Wine than many other Woods.

It has much the Appearance of Oak when dry'd and cut out; and the ſmaller Purpoſes of Oak are anſwer'd by this in common. They make Laths of it as regularly as of the Oak, and the Workmen purchaſe them at the ſame Price. In thoſe old Buildings where Cheſnut Timber has been uſed inſtead of Oak, many a Workman has been miſtkaken, and paſſed it over as Oak on his Examination. It will bear to lie continually in Water, and is therefore uſed in Mills and Sluices; but where it is at Times wet, and at others dry, it comes to nothing.

The Timber of the Cheſnut is ſeaſon'd by dipping it in boiling Oil; and if after this it be pitched over, there is no End of its laſting.

When the Cheſnut is planted in Coppices, or cut down in the Manner of Coppice Wood, it affords ſtrait, ſtrong and even Poles, that are fit for the Service of Hop Planters, and on many the like Occaſions. But it muſt be acknowledged, that the Timber, although it has the Appearance of the Oak, has not its Virtue of long remaining ſound, for it is very apt to grow rotten: and will often have a very fair Appearance on the Outſide, when there is only Duſt deep within.

CHAP. XL.

Of the Service Tree.

THE right Service Tree is a tall and beautiful Tree, and very well worth planting for its Timber. There are two or three other Kinds which are called by the ſame general Name, and they agree in the Nature of the Wood, as well as in the Flowers, and the Shape of the Fruit; but they vary in the Shape of the Leaf, and the Degree of Goodneſs. Theſe other Kinds are diſtinguiſh'd by the Names of the Service Tree, with the Fruit red in the Middle. 2. The ſhort fruited Service; and, 3. The wild Service or Quick Beam.

The firſt is the moſt valuable, and the two next come neareſt its Nature. The laſt differs more, and as it is not generally accounted of the Service Kind, but called by a diſtinct Name; I ſhall treat of in a Chapter by itſelf. The Flowers of the others are much alike, they appear early in Spring, and the Fruit is very rough to the Taſte till thoroughly mellow. All the Summer it makes a beautiful Appearance.

The beſt Soil for the Service Tree is a tough and firm Loam, with ſome rich Earth among it. Such are very common toward the Foot of Hills, or on any gentle Aſcent, and theſe are the beſt Situations alſo for this Tree. When the Soil is too light, the Tree grows very ſlowly; and when it is too dry, the Fruit is ripen'd very poorly, neither do the Leaves ſtand their Time. When the Service is judiciouſly planted, it grows quick, and anſwers very well to the Huſbandman; but when the Plantation is made at random, none anſwers worſe. Few know its Value, becauſe few have given it a fair Trial; nor is its Timber ſo much known, or ſo common to be had, as it ought to be, for this very Reaſon. He who will fall into the Method of raiſing theſe Trees, will do a Service to the Publick, as well as to himſelf; for there needs but a beginning to incite others, and the Conſequence would be a ready Market for the Timber, and it would prevent the Importation of a great deal of foreign fine Wood; which, however called by ſounding Names, is inferior to that of the Service Tree in Beauty, and in Value.

The Service may be raiſed from Seed, but the better Way is by Layers, which take Root very freely, and are naturally produced in great Abundance. The Method of raiſing Trees this

Way, has been laid down under the Article of the Elm, and need not be repeated. Thoſe who have a mind to raiſe them from Seed, muſt ſow them in ſhallow Trenches, in a Nurſery, and keep them clear from Weeds. At two Years old they muſt be planted out at a Yard Diſtance, and three or four Years after that, be ſet where they are to ſtand. Such as want only a few Trees, may conveniently enough raiſe them from Suckers, which grow about the old Trees in great Abundance. Theſe are to be tranſplanted early in Spring, and they take Root freely.

Which ever Way the Service Tree be rais'd, it ſhould be carefully trim'd up for the firſt eight or ten Years, that it may not ſpread into Branches till a certain Height, when there will be a handſome Trunk for Timber. After this it is beſt left to itſelf.

It is a very proper Tree for Avenues, Clumps and Hedge Rows, and 'tis great Pity that it is not more frequent. Its Beauty ſhould be an Inducement to the Gentleman, and its quick Growth and valuable Wood to the Huſbandman.

The Grain of the Wood is very beautiful, and its Variegations often exceedingly pleaſing. It is excellent for the Cabinet-maker, the Turner, and the Carver, being ſoft, and yet ſufficiently firm. The Stocks of Guns are ſometimes made with it, and Eſcrutores, Chairs and Tables. It alſo ſerves for many of the ſmall Works in Wood; and when properly oil'd and varniſh'd, imitates and ſupplies the Place of the foreign Woods in ſeveral of the ornamental Pieces of Furniture, and nice Inſtruments.

CHAP. XLI.

Of the Quick Beam.

THE Quick Beam, or, as ſome call it, the Quicken Tree, or according to others, the wild Service, or the flowering Aſh, for it has all theſe Names, is properly a Kind of Service Tree, though, from its particular Form and Uſes, treated of here ſeparately. It is a beautiful but ſmall Tree, being one of the leaſt of thoſe that are accounted Timber Trees, or planted for that Purpoſe.

The Bark is pale and ſmooth, the Leaves are beautifully form'd, each being compoſed of many ſmaller, which are long, narrow, and finely dented at the Edges. The Flowers ſtand in great Bunches at the Ends of the Branches, and are whitiſh, large and handſome: and after theſe come beautiful Berries red like Coral.

This elegant little Tree is Native of England, and is a great Beauty and Ornament to our Coppices and Hedge Rows, in thoſe Counties where it is moſt frequent. Its fair Appearance has occaſion'd its being taken alſo into Gardens, where it makes a fine Figure in the Wilderneſs Quarters.

The beſt Soil for the Quick Beam is a light and dry Loam; and it grows beſt on a ſomewhat riſing Situation. No Tree is better ſuited to thrive in Hedge Rows, where the Soil is light and dry. It roots itſelf very firmly; and ſhoots up in a moderate Time to its full Stature.

The beſt Way of raiſing the Quick Beam is from Seed. The Berries are to be gather'd when full ripe, and ſown after they have been ſpread a Fortnight in a dry airy Garret. They ſhoot up very regularly and freely, and ſhould be removed from their firſt Bed to ſome other Part of the Nurſery at two Years Growth, and planted at two Foot Diſtance. Three or four Years after this, they are fit to be tranſplanted to the Places where they are to ſtand; and a ſmall Nurſery will thus, with little or no Trouble, raiſe ſuch a Quantity as will ſtock a large Piece of Ground; where being ſet in Hedges, or the Banks of Coppice Woods, and other ſuch Places, they will quickly grow to ſome Value.

Thoſe who would only raiſe a few Trees, may take up Suckers from about the old ones, for they riſe in Abundance, and grow freely.

The Quick Beam ſhould have very little trimming or lopping; for, as it is not to be carried to a large Tree, 'tis beſt left to Nature, the Branches of themſelves growing with a pretty Irregularity.

Few of our Trees are more hardy than the Quick Beam, or better bear the cold Winds: ſo that the Farmer who has a light Soil in ſuch an Expoſure, as few other Trees will bear, may plant this, which will be a Shelter to his Grounds, and after a few Years may be felled to Advantage, he taking Care to raiſe young Trees between the old ones by way of Supply.

The beſt Time for felling it is in November, for at that Time the Wood is in a Manner all Heart, and is more laſting than ſuch as is cut at other Seaſons.

The Timber of the Quick Beam is tough, and not heavy. It is uſed in making all Sorts of Carriages, from the Wheel-barrow to the Coach. Where it is in Plenty, the Farmers make moſt of their Implements of it; and it anſwers their Purpoſe ſo well, that it would be worth their while to plant it much more generally than they do for their own Service.

We have before ſet down the Methods of raiſing the more valuable Kinds of Timber Trees, but it is fit the Huſbandman ſhould underſtand the Nature, and the Culture of all; that where one Kind will not do he may plant another, ſo that no Part of his Ground may be without its Uſe.

CHAP. XLII.

Of the Birch.

THE Birch is a Tree of a moderate Size, quick Growth, and very pretty Appearance. It alſo anſwers many Purpoſes in the Affairs of Life, though not of the moſt important Kind; and produces the Owner a tolerable Profit, though its Price come not near that of the ſeveral large and more conſiderable Timber Trees.

Its Bark is ſmooth and gloſſy, its Leaves

are roundiſh and of a fine green; the Twigs are reddiſh, and very ſlender and knotty: well known to School-boys. The Flowers are ſmall, and hang in Catkins like thoſe of the Hazel. The Fruit grows on other Parts of the Tree, and is a little light Cone. There is no Choice of Kinds in the Birch, for we have but one: it is remarkable of this Tree that it naturally caſts its outer Bark every Year.

The Birch Tree is a Native of our Country, and it ſeems indifferent to all Kinds of Soils and Situations; it will live on ſandy Hills, and in the rotteneſt Bogs: and it will ſtand in Hedge Rows, though its beſt Situation is in Coppice Woods. No Soil is too barren for it: whether it be gravelly, ſtony, chalky, or whatſoever, the Birch thrives upon it. But though it will do on any Ground, 'tis fit the Huſbandman be inform'd, that for quick Growth, and the beſt return of Profit, he ſhould plant it in the damper Parts of ſome Coppice Woods, where it grows up quickly to ſuch a Size as to be uſeful.

The Birch Tree is beſt raiſed from Suckers. Theſe are produced in great Plenty about the old Trees; and are to be taken up in February, and planted where they are to remain. They will take Root freely, and ſhoot quick: but in order to make them grow in the beſt Manner, the Planter ſhould, when they have ſtood two Years in their new Place, cut them down four Inches from the Ground, and watch the new Shoots. He is to reſerve the faireſt and ſtraiteſt of theſe; rubbing the reſt off: and in this Manner the Birch with a little Care at Times to prevent its ſending out Side Shoots too low, will riſe to a tolerable Tree. But it is not worth while to keep it to any great Growth, for the Timber brings but a poor Price.

The beſt Time for felling the Birch is the End of November; for no Tree abounds ſo with Sap in the growing Months, and 'tis beſt to cut it when that is moſt down.

The Timber is light, but has ſome Strength. It is uſed for making light Carts and Yokes, and many other Things in the Farmer's Way, for it works eaſily, and is tolerably laſting. Turners uſe the large Wood for Bowls, Diſhes and Trenchers: and the leſs uſeful Part makes excellent Charcoal. Brooms are made of the Twigs: a great deal of Birch is raiſed for this Purpoſe, and near large Towns, yields a very conſiderable Profit.

When the Birch is intended for this Uſe, it is to be planted juſt as before directed, only when it has ſtood one Year it is to be cut down to the Ground, or within a few Inches of it; and all the Shoots are to be ſuffer'd to grow. Theſe ſoon become fit for Hop-poles, and other ſuch Uſes, and furniſh Abundance of Twigs for the Broom-man.

Hoops are in ſome Places made of the Poles, and Bakers Panniers frequently of the Timber. Smallcoal is generally made of the Bruſh Wood of the Birch; though any other light Wood anſwers the ſame Purpoſe. The Antients wrote upon the Bark of the Birch inſtead of Paper.

Laſtly, We are to mention the Uſe that is made of the Sap of this Tree for Wine. It bleeds the moſt freely of all our English Trees, and its Juice is not only the moſt in Quantity, but the beſt of any for this Purpoſe. The Time of tapping the Tree is in the Beginning of March, the Juice which runs freely from the Wound is of a pleaſant Taſte, and being work'd up with Sugar, or with Honey, which is the better Way, makes that agreeable Liquor called Birch Wine, or Birch Mead.

There are two Ways of getting the Sap; the one by boring a Hole in the Tree, and the other by cutting off the Ends of ſome of its Branches. When a Hole is bored in the Trunk, a Piece of Chip is to be ſet againſt it to guide the Sap into the Veſſel put to receive it; when the Ends of the Branches are cut off, they are to be let into Quart Bottles, a great Number of which may be hung upon one Tree, and will quickly receive their Quantity of the Sap.

The Sap runs moſt freely in the middle of the Day, and in the warmeſt Weather. A South or Weſt Wind ſets it a going; and a North or Eaſt ſtops it, or makes it drip much more ſlowly. This, when made into Wine, is a pleaſant and wholeſome Drink, and has a conſiderable Effect in ſweetening the Blood; and curing the Scurvy.

CHAP. XLIII.

Of the Horn Beam.

THE Horn Beam is a beautiful and regularly growing Tree. Its Bark is brown and tolerably ſmooth, and the Wood firm. The Leaves are ſhort and indented at the Edges, they are ſomewhat like thoſe of the Elm, but of a more beautiful Green. The Flowers are ſmall and inconſiderable. They hang in Catkins like thoſe of the Hazel; and the Fruit, which is dry and light, grows on a different Part of the Tree.

There are four Kinds of this Tree raiſed in Nurſeries. 1. The common Horn Beam. 2. The Hop Horn Beam. 3. The flowering Horn Beam; and, 4. The Horn Beam with ſtriped Leaves: but the Huſbandman who would plant for Advantage, has nothing to do with any of theſe except the common Kind.

The Horn Beam is an extreamly hardy Tree, it will grow in the worſt Soil and bleakeſt Situation. For this Reaſon it is very proper to be planted on the Tops of cold Hills, and in Places ſo expoſed, that other Trees will not grow on them. It will thrive very well in Hedges, and in Woods; and is excellent for Clumps in the bleakeſt and worſt Parts of Parks, and it every where engages the Eye by its Beauty.

The beſt Way of propagating the Horn Beam is by Layers, the Directions for which are laid down under the Article Elm. It may alſo be raiſed from Seeds, but this is a more tedious Method, and the other does as well. If the Seeds are prefer'd, they muſt be gather'd in September, and ſown three Weeks or a Month after, laying them in the mean time in a dry airy Place. They will ſometimes come up in five or ſix Months, ſometimes they will lie till the

the following Spring. They are to be thin'd ſoon after they appear, and kept clear of Weeds, and at two Years old to be removed to another Part of the Nurſery, where they muſt be planted at a greater Diſtance, and three or four Years after they are to be finally removed, and ſet where they are to remain. But the Method by Layers is much more expeditious, and the Trees grow as beautiful that Way as the other.

The Horn Beam is very fit to be raiſed for the Garden as well as Field; for ſcarce any Tree makes a more beautiful Hedge. When it is intended for this Uſe, the Side Shoots are to be left on, and it is be train'd up flat; but when planted for Timber, it ſhould be trim'd up that it may grow with a good Trunk. The Hop Horn Beam is better for the Garden than the common Kind, becauſe this does not drop its dead Leaves ſo readily, but they hang on in Winter, and are an ill Sight; but the common Kind is beſt othetwiſe. Its Uſe in Hedges is very great, becauſe it bears clipping, riſes to a great Height in a moderate Time, and will be thick and cloſe at the Bottom when it is twenty Foot high in the Hedge. It roots alſo very firmly, ſo that it ſtands the Force of Winds; and is a fine Shelter to the other Growths.

Its Leaves, beſide their Beauty both in Shape and Colour, have this Advantage over moſt others, that they appear earlier in Spring, and continue longer green in Autumn. One of the greateſt Beauties of the Gardens at VERSAILLES, is the Height, Beauty, and Regularity of the Horn Beam Hedges.

The Farmer will find his Account in it whether he plant it in Hedges, in Coppice Woods, or on waſte Grounds; and whether he train it up for a Trunk, or cut it for Shrowding. In general he ſhould carry it up for Timber in his better Soils, and ſhrowd it where the Ground is very poor. In this Caſe the Branches ſhoot very quick, and afford good Fuel; and the Trunk cut down at a proper Time, uſeful Timber. In Coppice Woods it ſucceeds very well, and bears the dropping of the Trees left for Timber better than moſt others.

The ſmall Wood of the Horn Beam is good for Fuel, and makes an excellent Kind of Charcoal. The Timber is of a pale Colour, firm and ſtrong; but harſh, and of an uneven Grain. It is employ'd for many Purpoſes where Strength is requir'd, more than Beauty. Nothing is better for Mill Coggs: the Heads of Beetles and Mallets are alſo made of it; and the Turners uſe it ſometimes for the ſtronger and coarſer Kinds of their Ware. The worſer Parts of the large Wood ſplit make excellent Billetting, burning pleaſantly and laſting.

CHAP. XLIV.

Of the Maple.

THE Smallneſs of the Maple does not prevent it from being a very valuable, as well as a beautiful Tree; and 'tis a Wonder that more Notice is not taken of it by thoſe who have any regard to planting.

The Tree we call the Sycamore, as already obſerv'd, is only a large Kind of Maple; and this which we call by the Name of Maple, reſembles it accordingly in Flowers and Seeds; and, in ſome Degree, even in the Leaves. The Bark of the Maple is browniſh and very rough: the Leaves are broad and deeply divided at the Ends. The Flowers are ſmall and inconſiderable, and the Fruit reſembles that of the Sycamore, being a Kind of Keys, only ſmaller and fewer in a Bunch.

In the Nurſeries they raiſe ſeveral foreign Kinds of Maple, as the NORWAY and VIRGINIAN Sorts; but the ENGLISH Planter has no Occaſion to regard any except the common Kind, which is frequent in Hedges, and is very worthy of his Care to make it more univerſal.

The beſt Soil for the Maple is a good vegetable Mould, or mellow Earth, with ſome Admixture of Sand, for it does not thrive either in too tough or too light Soils: but it will live in almoſt any. The Situation that moſt favours its Growth, is a little Elevation. In Hedge Rows on the Sides of Hills in a good Mould, we ſee the Maple very luxuriant. But tho' the Hedges are its common Situation, it will live very well in Coppices and Woods, and, with Care, may be brought to a much greater Value than it uſually is.

The Maple is beſt raiſed from Seed, for it grows freely, and bears tranſplanting. The Keys are to be gather'd when perfectly ripe; and it is beſt to pick them from the largeſt and moſt flouriſhing Trees. They are to be ſpread upon the Floor of a dry airy Room for eight or ten Days, and after that ſown. Any waſte Piece of Ground does for a Nurſery, the poorer the better; and they are to be ſown pretty thick in Trenches, drawn acroſs the Ground at ſmall Diſtances, and lightly cover'd with the Mould.

They will ſhoot up early the next Spring, and require very little Care afterwards. At a Year and half old they muſt be planted out at two Foot Diſtance, and three Years after that is a good Time to remove them to the Places where they are to ſtand.

We have already named the moſt favourable Soil and Situation for it; but the Planter needs not ſtint himſelf to that ſingly. Let him avoid wet Places, and for the reſt he cannot do much amiſs, Chalk, Sand or Gravel will feed the Maple: only let him obſerve that in theſe poorer Soils, he muſt not expect it to grow to any Size. When he has a right Soil and Situation, let him train it up to a Tree.

To this Purpoſe when it is removed into the Place where it is to ſtand, let him take off all large Side Shoots, leaving only a Head and a few little Branches to draw up and detain the Sap in the Trunk. Thus trimming it up for a Tree, he will bring it to better Form than it is commonly ſuppoſed capable of, and will greatly encreaſe its Value.

He is never to ſhrowd the Maple, or favour its ſpreading, for the Droppings from it are hurtful to all Things; and particularly a clammy Dew that gathers upon it.

The Maple is but a ſlow growing Tree; but it makes Amends in the Beauty of the Timber,

the finer Pieces of which are of conſiderable Value. Its Keys make a pretty Appearance when ripe, and it would, for that Reaſon, have a Place in Gardens, but that the foreign Kinds have the Preference.

The Wood of the Maple is of a cloſe and beautiful Grain: it cuts eaſily, and has a Firmneſs that holds it together in ſmall Works, whence it is greatly valued by the Turners and Carvers. And when it happens to be vein'd, as is frequently the Caſe, it is uſed for fine Works by the Cabinet-makers, and in inlaying, it is then called the curl'd Maple, and Peacock-tail Maple.

They make Gun Stocks, and ſometimes Knife Handles of it; and it is turned into Cups, Spoons, Trenchers, and Diſhes, all very beautiful.

The Timber of the Pollard Maple is moſt apt to be curl'd and variegated; but it grows hollow very ſoon in this Form, and there is no depending upon its Soundneſs, except when 'tis carried up to a ſtandard Tree. In Hedges it is brittle, but it will grow after breaking or cutting, if but the ſmalleſt Piece remain with any Bark upon it.

The Maple Wood has heretofore born a great Price, but the Uſe of foreign Woods has let down its Credit: the Romans held it next in value to the Cedar. The knotty Parts of the Tree are moſt beautifully vein'd; and what is called by our Cabinet-makers French Maple, is no other than the irregular growing Parts of the Trunk of an old Maple, that happens to keep ſound. That Part of the Wood which grows near the Root of an old Tree is alſo very beautiful: and ſometimes there ſtand out large Knots from the Surface of the Trunk, which, when cut through and well poliſhed, have a moſt elegant Variety of Veins and Marblings.

The Norway Maple is ſo hardy that it may be cultivated here without Difficulty, and it will be eaſier rais'd to a large Tree than our common Kind: but its Wood has not that Excellence. In Appearance this more reſembles the Scycamore than the common Maple; and it has an Advantage over it for Plantations near Houſes, that the Leaves remain more entire. The ſweet Juice that gathers about Sycamore Leaves entices Inſects, which eat them to Pieces, but the Leaves of the Norway Maple are ill-taſted and therefore eſcape.

In ſome Parts of North America, they make Sugar from the Juice of the Maple: and the ſame has been done here from the Juice of the Sycamore, which, as before ſaid, is only a large Maple: it has been try'd and found to yield it in large Quantity.

CHAP. XLV.

Of the Cherry Tree.

THE Cherry Tree, though cultivated in general for its Fruit, is not to be deſpis'd on Account of its Timber; and might be worth planting alone for that, were there no other Advantage attending it. It is a large and tolerably well growing Tree, when carried up to an Height by trimming; though the uſual Intent of raiſing it being for the Fruit, it generally is made to ſpread into Branches.

The Bark of the Cherry Tree is brown, and tolerably ſmooth; the Leaves are large, longiſh, and ſhining, the Flowers are large and white, or rediſh, and the Fruit is round, or nearly of that Shape, with a Kernel included in a hard Stone. We have a great many Kinds of Cherry, but there are two principal, the black and the red; and to one or other of theſe all the other Sorts are to be refer'd; the black Cherry being ſmall and the red large. The Heart Cherry is of the red Kind, and the Variety of others nam'd from the Fancy of Gardiners and Nurſery-men do not deſerve the Notice of the Huſbandman, who means to plant the Cherry as a Timber, as well as Fruit Tree.

The black Cherry naturally riſes to a tall and well-ſhaped Tree, and the red may be brought to it: and theſe may be rais'd without any particular Trouble, and will yield Profit enough to the Planter. The others require all the Arts of the Gardiner; and we ſhould carry the Farmer out of his Way to lead him to them. All thoſe fine Kinds are cultivated by budding or grafting them into the wild black or red Cherry Stock; and the Gardiners tell us this is becauſe thoſe are free Shooters; this is enough to ſhew the Huſbandman that it is his Intereſt to plant them: for the free ſhooting, and quick Growth of a Tree are to him Articles of the greateſt Conſequence.

The beſt Soil for the Cherry is a Loam; this Tree does not require a rich Earth, but it will not bear the two Extreams of Clay or Sand. In the clayey Soils its Roots are ſtarv'd, and in the ſandy they are burnt up, but on any other Ground it will grow very freely. Too much Dryneſs or too much Moiſture are equally Enemies to the Cherry Tree. But it will ſtand and grow to Timber under many of theſe Diſadvantages, though they affect the Fruit.

The Cherry will grow in any Situation, but it does not thrive well when too much expoſed, as on the Tops of bleak Hills. It is obſerved to ſhoot the quickeſt, and arrive at its Bigneſs ſooneſt, in Soils where there is a good Degree of Moiſture; but the Timber is moſt valuable where it has grown on a dryer Ground.

The Cherry is to be propagated by ſowing; and the beſt and moſt advantageous Kind is the black. The Stones ſhould be ſaved from ſome of the beſt Fruit of a large and tall Tree, and us'd ſoon after they are gathered; they ſhould be ſown in a Piece of poor Ground, in Trenches, and covered two Inches and an half with the Mould. When they ſhoot, the young Trees are to be thinn'd, and kept clear from Weeds, and at a Year's Growth they ſhould be removed into a larger Bed, and planted at eighteen Inches Diſtance, in Rows two Foot and an half aſunder. Thus they are to ſtand till they are large enough to remove into their proper Places.

They may be planted in Hedge Rows, Orchards, Parks, or Warrens, and the proper Diſtance is about five and thirty Foot; the beſt Way is in Rows, and theſe ſhould be forty Foot aſunder. Thus they may be train'd up to uſeful Trees of

Timber, and at the ſame Time afford a conſtant Profit from the Fruit.

The Cherry Trees in many Parts of England ſtand in the Hedges, and where the Property is ſecured by Cuſtom it is a very good Method; but in Places where idle People will make free with the Fruit, they will be broke to Pieces in the gathering it; and the Hedges ſpoiled all about.

It is better, in theſe Places, to plant a poor Field with them by way of Orchard, and the Ground may be tilled between them, eſpecially while they are young, as much as if it were clear. The only neceſſary Caution in ſuch a Plantation is, that it be defended from weſterly Winds, for they are always hurtful to this Tree. The more the Trees are carried up for Timber, the longer the Ground may be tilled between them; for when they are ſuffer'd to ſpread at a ſmall Height, as is uſually done when they are planted only for Fruit, they ſoon ſhadow the whole Ground, and injure the Growth of any thing ſown upon it by their Drippings.

There is this farther Reaſon for carrying the Cherry Tree up for Timber at preſent, that the Fruit bears ſo ſmall a Price it ſcarce pays the Charges of gathering in a bad Year; and affords very little Profit even in the moſt favourable.

Both the black and the red Cherry, properly train'd up for Timber, by cutting off the young Branches that would ſpread too much, and carrying the Tree to a Top, will grow large, regular, and beautiful. They make a very good Appearance in Avenues, and other regular Plantations, when rais'd for that Purpoſe; for though the Cherry in Orchards is a very ill looking Tree, this is not ſo much in its own Nature, as the Manner of cultivating it. A well grown Cherry when in Bloſſom, makes an elegant Appearance, as alſo when in Fruit, where theſe are ſuffer'd to hang undiſturbed.

One thing is very eſſential in the preparing the Cherry Tree for Timber. When it is tranſplanted from the Nurſery, the uſual Way is to cut off the large down-right Roots: this is right when it is rais'd for the Fruit, becauſe it prevents the Trees riſing in Height, and makes it ſpread into Branches: but juſt the contrary of this is the Deſign when the Cherry Tree is rais'd for Timber; and therefore the long Root is, in this Caſe, to be left entire at the Removal, and the top Shoot never ſhorten'd or injur'd.

Thoſe who want only a few Trees may raiſe them from Suckers, which grow in Plenty about the Roots of the old ones, but it is a much better Way to ſow the Stones, and the Trees are always the fairer.

We are accuſtomed to ſee certain Kinds of Cherries cultivated in certain Places, and ſome have ſuppoſed they thrive particularly there; but there is nothing more in this, than that Cuſtom has become the Law of the Huſbandman; and he plants the Kind he ſees planted by his Neighbours. Red Cherries are cultivated in Kent in ſuch Plenty, that they have obtained a Name from the Place; and in the ſame Manner black Cherries ſeem peculiar, in a Manner, to Hertfordshire. But I have ſeen as good black Cherries in Kent as in that County; and have eaten Kentish Cherries in Hertfordshire as good, and from as fair and flouriſhing Trees, as any in the Country from which they are named.

The red Cherry requires a ſomewhat richer Soil than the black; and the Huſbandman who intends to raiſe theſe Trees ſhould guide himſelf accordingly; not planting black becauſe in one County, or red becauſe he happens to live in another; but the red if his Soil be better, the black if it be worſe.

The Seaſon for felling the Cherry Tree is about the Middle of November; and it is proper to obſerve this punctually, becauſe a great deal of the Value of the Timber depends upon its being cut at a proper Time.

The Woods of the red and black Cherry are very much alike, but that of the black is fineſt, and the Tree is more free to grow ſtrait, tall, and upright. This Timber is not only valuable for its Beauty but its Strength. It will grow to ſuch an Height and Thickneſs in the Trunk, that it will afford good Beams for building; and Experience has ſhewn that they are equal to any Timber, except the Oak, in their Strength and laſting. And it is fit for the Cabinet-maker as well as the Carpenter.

Of all the European Woods there is none that ſo much reſembles Mahogany, as the Timber from the Trunk of a good ſound black Cherry Tree. We are ſenſible that at this Time theſe Trees are rarely rais'd for this Purpoſe; and that what is called Cherry Tree Wood is cut from the red or black Cherry indifferently, and juſt as it happens a Tree has been cut down; but even under theſe Diſadvantages Chairs and Tables are made of it, which have an Appearance of that Wood. It is certain the Reſemblance might be brought much nearer by proper Care.

Mahogany itſelf is not of that beautiful Colour when firſt cut. Time gives it the greateſt Beauty, and when it is freſh wrought into Cabinet-work, they rub it with ſeveral Things to ſtain it. They uſe particularly for this Purpoſe, a red Earth, that is dug in the Iſle of Wight: from the Colour it gets by this, and well oiling, it by Degrees becomes of that beautiful Hue we ſo much admire. Now let a Piece of Timber from the ſound Trunk of a black Cherry Tree be wrought in the ſame Manner, be rub'd with the ſame red Earth, and oil'd as the Mahogany is, and I am of Opinion, if not equal, it would be found very nearly equal in Beauty.

Now is it not worth the Planter's while to raiſe a Tree which will be next to the Oak in Strength, and next to the Mahogany in Beauty?

If the Size of the Timber ſhould be objected, it muſt be by thoſe who have not much obſerved the Tree: I have ſeen black Cherry Trees in the Hedges in ſome Parts of Hertfordshire, of a fine Thickneſs and Height in the Trunk; and when it ſhall become an Article of Huſbandry to raiſe it for the Timber, doubtleſs we ſhall ſee it much larger and finer. There is nothing in Nature to prevent it; moſt of the Form of Trees is owing to the Management of them when young.

The Cherry Tree will grow among other Foreſt Trees in Woods, as well as any Kind, and though it bear little Fruit this Way, it will riſe ſtrait, and

with a tall Trunk; nor is any Tree fitter to be mixed among Coppice Woods, for it grows very freely, and when thus carried up in Height does little Hurt by its Shade. The Boughs are good for Fuel, and it will anſwer many of the other Purpoſes of Coppice.

In fine, the Reaſon why the Cherry Tree has not been ſo much regarded as it ought as a Timber Tree is, that it is underſtood to be of the Fruit Tree Kind: but hereafter, I hope, we ſhall ſee it rais'd on the other Account, in which it is more valuable.

CHAP. XLVI.

Of the Pear Tree.

AFTER the Cherry it may be proper to mention another which is ſo generally looked upon as a Fruit, that it is rarely conſidered as a Timber Tree, although its Wood is, in many Inſtances, ſuperior to any other in the World. This is the Pear Tree, which I hope to remove from the Orchard to the Hedge, and to ſhew the Huſbandman that he has as much Reaſon to value what is called the worſt Kind, as the Gardiner has to prize the beſt.

The Pear Tree, when properly managed, is a large, tall, and well growing Tree. The Bark is rough, the Leaves are roundiſh, and the Flowers reſemble Apple Bloſſoms, but they are whiter. The Fruit is ſufficiently known. It is naturally ſmall, longiſh, and larger at the End fartheſt from the Stalk. Art has brought in a Multitude of Varieties of Taſtes, Colours, and Names of Pears, but the Huſbandman has nothing to do with any of theſe. He is to conſider the Tree for its Timber, and the only Kind that ſhould be planted for that Purpoſe is the common Choak Pear, called in ſome Places the wild Pear: this is the Kind from which all the reſt have been produced by Culture; and is that of which, when leaſt improved, Perry is made. This grows freely in Hedges, and will eaſily be train'd up for Timber.

The Pear Tree will grow in any Soil, and there is ſcarce any in which it will not thrive. It bears a moderate Degree of Moiſture, without any Injury, and only grows the quicker for it; but too much will deſtroy it, and hurt the Timber before any viſible Sign of Decay appears on the Leaves or Branches.

It will grow as well on flat Ground as the Sides of Hills, but does beſt where there is a Depth of Soil. The Pear Tree is beſt rais'd from Seeds. And for this Purpoſe the Huſbandman is to mark a fair and upright Tree, and gather the Fruit juſt when full ripe. A poor Piece of Ground is to be choſen for a Nurſery, and the Trees are to be rais'd and train'd up, as directed for the Cherry. Only taking great Care on the laſt Removal, not to injure the main Root.

The Pear Tree thus rais'd will grow to a conſiderable Height, with a ſtrait and ſingle Trunk, before it begins to bear any Fruit; but when it has once began, the Produce will be yearly very great; and the Fruit, though but poor in Taſte, will yield a great Profit, if made into Perry, which is very eaſily done; as ſhall be ſhewn hereafter; for the Vintners and Wine Coopers are always ready to take it off in any Quantity.

It is ſtrange that this ſingle Circumſtance has not led People more into the propagating this Tree; for the Quantity ſent up to London was never yet enough for the Demand.

While theſe Trees are thus enriching their Owner yearly by their Fruit, they will be all the Time growing up to Timber. A proper Supply of young ones ſhould be planted againſt the Time of felling, that they may yield Fruit for Perry when the others are gone. If theſe Trees are planted in Hedge Rows, forty Foot is a good Diſtance; and four or five Years before the old ones are to be fell'd, there ſhould be brought a Supply of Trees of about ſix Years Growth from the Nurſery, and planted at every forty Foot, as the others, one between each Couple of the old ones.

The old Trees, when fell'd, ſhould be ſtub'd up, and from this Time the young ones will flouriſh and bear ſurprizingly.

The Timber of the Pear Tree is of a delicate fine Grain. It cuts eaſily, and takes a beautiful Poliſh. It is equal to any for the fineſt Works of the Turner; and the Carvers are with Reaſon very fond of it. It is alſo in ſome Places, wrought into Tables, Chairs, and other Furniture. In the Beauty of its Colour, Cloſeneſs and Evenneſs of Grain, and yielding to all Inſtruments in working, it is ſuperior to any Wood whatſoever. There is at preſent a very certain Market for it; but if the Supply were greater the Demand for it would riſe in Proportion, for it would then take the Place of many other the fine Woods.

CHAP. XLVII.

Of the Hazel.

WE now come to the Conſideration of a Tree of ſmall Stature, but being a Fruit Tree it properly follows the others of that Kind, and notwithſtanding its Smallneſs it has ſufficient Value to make it worth the careful Huſbandman's while to look upon it with Regard to Profit.

The Hazel is a low Shrub with broad indented Leaves, and a brown tolerably ſmooth Bark. The Flowers are in a Kind of Catkins. The Fruit is well known, it grows in a different Part of the Tree from the Flowers, and uſually in Cluſters of three or four together.

The Filberd is the Hazel improved and enlarged by Culture; and beſide this we meet with two or three other Kinds among the Nurſerymen. There is firſt, the little white Nut Hazel; ſecondly, the great or Cob-Nut Hazel; thirdly, the red Filberd; fourthly, the white Filberd; and laſtly, the great Spanish Nut, which is angulated on the Surface. Theſe have been only rais'd from the common Hazel, and are not worth the Huſbandman's Regard, he is to ſtick to the natural wild Shrub, leaving theſe to the Nurſerymen and Gardiners.

The Hazel is a ſtout and hardy Shrub, it will grow on the pooreſt Soils, and ſtand in all Expoſures.

poſures. This is a great Article of its Value, for it will ſucceed where many other Trees would altogether fail. It will grow in the toughеſt or the looſeſt Soils; in Clay, and in Sand; and flouriſhes very well in ſtony Grounds. But the Soil and Situation that ſuit moſt perfectly with it, are a freſh light Earth, on the Side of a Hill, eſpecially if not too ſhallow.

Many propagate the Hazel from Suckers, which they are tempted to do by the great Abundance of them that it produces; and by the Freedom with which they take Root: but the beſt Method is from Seed, and this is ſo eaſy, that 'tis not worth while to take any other.

To this Purpoſe let the Huſbandman gather a good Quantity of Nuts when they are thoroughly ripe, from the moſt flouriſhing Trees. Let a Bed of Sand be ſpread upon the Floor of ſome cool Room, and theſe Nuts laid on it, covering them with a little more dry Sand; and thus they are to lie the whole Winter. In FEBRUARY they are to be ſown in Trenches, in a poor Ground, and tranſplanted when they are of two Years Growth. They are to ſtand a Couple of Years in their new Place, and then to be removed to the Hedge Rows, or elſewhere, where they are to remain.

When a Coppice is raiſed from Seed, the Nuts may be ſown among the reſt, but it may be thicken'd afterwards by tranſplanting more of them into it.

The Nurſerymen and Gardiners propagate their Filberds by Layers; but though this may be the beſt Way, when they are raiſed for the Sake of the Fruit; the ſowing them is beſt for other Purpoſes.

After they are removed to the Places where they are to ſtand, they muſt be cut down within five Inches of the Ground: if they are pretty large when they are removed, this may be done the firſt Year; but if ſmaller, it is better let alone till the ſecond.

When they are planted in Coppices, they are fit to fell with the reſt of the Growth, at twelve or thirteen Years old; and, after the firſt cutting, they may ſtand ſeven or eight Years.

No Shrub anſwers better for the thickening of a Coppice, by laying down a Branch, than the Hazel. One long Pole chop'd half through near the Ground, and cover'd for its whole Length five or ſix Inches deep with Earth, faſtening it down with a Peg, will yield a Row of fine Shoots.

The Hazel, when cut at ten or twelve Years Growth, yields a very good Price. It is eſteemed by the Hoop-makers, and on many other Occaſions; and, in ſome Parts of ENGLAND, is raiſed ſingly in very large Plantations for this Service. Its Fruit are a very great Diſadvantage, for they occaſion its being broke and torn to pieces by Boys, before it is in a Condition to cut; and this is a great Reaſon againſt planting the Hazel in Hedge Rows, where elſe it would thrive very well and grow to uſe. Not that it is by any Means a good Shrub for the ſerviceable Parts of a Hedge, for it does not grow cloſe, nor does it bear plaiſhing: it alſo wants Thorns for the Purpoſe of keeping off Cattle.

'Tis beſt to raiſe it ſingly in Plantations for the Hoop-makers, or among Coppice Wood. Beſide the Hoop-maker, it is uſed by the Thatcher, for the making of Hurdles, and on many other ſuch Occaſions. Its fine taper Shoots are uſed for fiſhing Rods, and the worſt of it is very good for faggoting.

The ſmall Branches of the Hazel burn to a fine light Kind of Charcoal, and are, in ſome Places, uſed for the making Gun Powder. The Chips of Hazel Wood are alſo uſed by the Wine Coopers, and are a very harmleſs Ingredient for the fining of Wines.

CHAP. XLVIII.

Of the Buckthorn.

FROM the Hazel we ſhall advance to another Shrub, whoſe Fruit is of Value; the Buckthorn. It is indeed of ſo much Value, that one is ſurprized the Huſbandman ſhould not think it worth his while to give the Shrub a Place in his Hedges; for it will, in a tolerable Soil, grow as freely there as any other Kind; and anſwer the Purpoſe of fencing better than many that are conſtantly planted there merely from Cuſtom, and without any particular Reaſon, or any tolerable Uſe.

The Buckthorn is a Shrub of ten or twelve Foot high, the Bark is brown and ſmooth, the Leaves are oblong, and the Flowers are ſmall. The Fruit is a Berry, roundiſh, black when ripe, and juicy, containing four hard Seeds, which are rounded on one Side, and flatted on the other.

This Deſcription of the Berry admits of no Miſtake in the Shrub, for if any one ſhould at random think to raiſe it from Berries bought at the Markets, he might be ſtrangely diſappointed; as the People who gather it frequently, though very diſhoneſtly, bring the Berries of the black Alder, and ſome other Shrubs among them: the Berries of the black Alder moſt reſemble them, but there are only two Seeds in each of theſe.

The Buckthorn Shrub loves a light and rich Soil. We ſee it in Hedges on other Kinds of Ground, but it does not flouriſh when it has not free Room to ſpread its Roots, and Plenty of Nouriſhment. For Situation, a Flat toward the Bottom of a Hill is the beſt; but there is no need to be very ſtrict in theſe Things: it may be planted among the Quick of a Hedge any where; only if there be Choice of Soils and Situations, it will bear its Fruit more plentifully and conſtantly, and it will ripen it better on theſe juſt named than on others.

Buckthorn is to be propagated by ſowing. And for this Purpoſe the Berries ſhould be gather'd from a thriving Tree late in Autumn, when they are thorough ripe; and ſown immediately in ſhallow Trenches, in a Bed of a loamy and light Soil.

When the young Trees firſt appear, they ſhould be water'd a little, if the Seaſon be dry, and kept clear of Weeds; after this they ſhould be treated exactly in the Manner of the Sloe or black Thorn Plant, as deſcribed already in their Place;

Place; and planted with the Quick on the Bank in making of the Hedge; where they will grow up with the reſt. One Plant of Buckthorn may be ſet at every fifteenth of Quick, and the Hedge will not be at all the worſe for it.

The Stem of the Buckthorn will grow to the common Bigneſs of the Hedge Wood, and when cut in the plaiſhing and new making the Hedge, will anſwer the uſual Purpoſes, and in the mean time every Year there will be a great Quantity of the Berries which ſell at a very conſiderable Price. The Apothecaries buy them to make a purging Syrup, which has its Name from the Shrub.

CHAP. XLIX.

Of the Alder.

THE Alder has been occaſionally mentioned in the preceeding Book, as uſeful for defending a mellow Shore from being undermin'd by the Stream of a River: but we are here to enquire more at large into its Nature, and after that, ſhall ſpeak of ſeveral other of thoſe Trees that grow in wet Places.

I have mention'd in the laſt Chapter, a Shrub called the black Alder, whoſe Berries are often mix'd among thoſe of Buckthorn at the Markets: but that is a little Shrub no way allied to the right Alder, except in the Shape of the Leaf, from whence careleſs People, not regarding the more eſſential Characters of either, called it by the ſame Name.

The Alder properly ſo called, is as commonly rais'd a very large Shrub, conſiſting of a great Number of tall and thick Shoots riſing from one common Stump; but it may be rais'd ſingly, and in Form of a Tree; and will acquire a very conſiderable Bigneſs. The Bark is ſmooth, and of a dark purpliſh brown Colour; the Leaves are large and roundiſh, and uſually feel clammy: the Flower is in a Catkin in the Manner of the Hazel; and the Fruit is a ſmall light Cone produced on a different Part of the Tree, and ſeldom much regarded.

The proper Soil for the Alder is a rich black Mould; and its proper Situation is in a Flat, near the Edge of ſome little River: it thrives particularly in half boggy Places, where the Water every now and then floats the Ground, and lies ſome time upon it. The little Rivers of Buckinghamshire and Hertfordshire, that run through rich Meadows, have a large Quantity of fine Alders upon their Banks; and whereever they overflow frequently, the ſame Trees riſe from the Spreadings of the Roots of the adjoining ones in great Abundance.

The great Benefit of this Tree to the Farmer is, that it will live and thrive in ſuch Places as will not agree with any other Kinds; and if ſuch Grounds were univerſally planted with it, it would be of great Benefit to the Owners, as there is a conſtant Demand for the Timber, though at a ſmall Price.

The Propagation of the Alder is extreamly eaſy, for the raiſing it in the uſual Manner in Clumps of Poles; but a little more Care is requir'd in propagating it for a Tree, and 'tis very well worth while to take it.

The Alder will riſe from ſowing the little Cone or Fruit, but this is a tedious Way. The common Method is to cut the Poles into Truncheons of a Yard long, and ſet theſe in the Ground in a rich wet Earth. They will grow as readily as the Willow or Elder; and thus naturally ſend up a great many Shoots, which is the common Intention in the planting them.

The Truncheons are to be planted in the Beginning of April. Some cut them immediately for that Purpoſe; others cut them in October, and tying them in Bundles, leave them with the larger End in Water all Winter, and then plant them in Spring. This they do to make ſure of their growing, but it is an unneceſſary Trouble: they generally ſtrike Root very freely; and if there be any Doubt, 'tis but planting ſome ſpare ones, and thoſe which do not take may be pulled up.

Another Method is to plant a Piece of the Root of an Alder deep in the Mud croſswiſe, that a Tree may riſe from it, and this deep laying in of the Root ſecures it from Injury by Winds. Others bury a long Pole of Alder, cutting off both Ends, and it will ſhoot up many Branches, which are to be cut off near the Ground, and then left to ſhoot afreſh in Numbers from each Place where they were cut.

But though all theſe Methods are not only recommended, and frequently uſed with Succeſs, I ſhall adviſe a Huſbandman to a Courſe quite different from them all; which is, to raiſe the Alder from Layers, in the Manner as deſcribed under the Article Elm: for no Tree whatſoever takes in this Method more freely. The Shoots taking Root immediately, and bearing tranſplanting excellently.

The Nurſery for this Purpoſe muſt be in ſome wet Place by a River Side, where a few Stools of Alder will afford a continual Supply. At a Year after the laying, the Shoots are to be taken off and tranſplanted. To this Purpoſe let there be a Number of Holes dug at ſeven Foot Diſtance every Way to receive them. Theſe Holes muſt be two Foot deep: the young Trees muſt be taken up carefully, and planted at leaſt a Foot and half deep upon ſome looſe Mould in the Bottom of the Hole, and the Earth well put in about them. Every Shoot will thus grow, and no Method is ſo certain or ſo advantageous.

One Year after they are planted let the Owner go over them, and take Notice which are the fineſt, ſtrongeſt and ſtraiteſt Shoots; theſe are to remain as they ſtand, but the weaker he is to cut down within about ſix Inches of the Ground. The Number to be left for Trees ſhould be nearly half, and the others will ſhoot up from the cutting in long and ſtrait Poles in the uſual Way. Thus he will have a Parcel of Alders riſing up to Trees, ſo far as their Nature will bear, and another Parcel of the uſual Kind, which are to be felled as common Alders, while the others remain like the Timber Trees in a Coppice, increaſing

in Bigneſs and Value, and ſtanding throughout ſeveral Cuttings of the ſmaller.

Alders growing in the common Way, are to be cut once in four Years. For they are a very quick growing Tree; the Wood being light, and there being Plenty of Moiſture for it, which is the great Support of all Growths.

The Bark of the Alder was at one Time in Uſe among the Dyers for black, but at preſent it is little regarded. While it was uſed to this Purpoſe, the Time of felling the Alder was in Spring, becauſe the Bark then came off eaſy. At preſent 'tis felled in November and December, and the Wood is found of a greater Firmneſs than it uſed to be when cut in the Sap Seaſon.

It is, however, proper to bark the larger and better Pieces of the Alder whereſoever they are cut, tho' the Bark be not uſed for any Thing; for there are apt to breed Worms under the Bark which deſtroy the Timber, but it is ſeldom hurt by them when the Bark is off.

No Tree grows quicker than the Alder, nor does any of the ſoft Wood Kinds make a better Return in Profit; 'tis therefore a Wonder it ſhould be any where neglected where there is Ground that is fit for it. The Farmer always finds Purchaſers at a better Price for his old over-grown Alders, as they are called: therefore why will he not raiſe a Quantity of good Trees to ſuch a Size.

The Uſes of the Alder are many. The ſmaller Poles make Hurdles and Gates as well as any Wood whatſoever; and of the larger Pieces, Chairs, Country Utenſils of many Kinds, and Clogs and Shoe Heels are made, and a great Number of other Things that require a light and yet firm Wood.

It bears to lie wet as well as any Wood whatſoever, but then it muſt be always in Water, for if it be ſometimes dry and at other Times wet, it periſhes quickly. We read in the old Latin Authors, that the Alder was made the Foundation of Bridges, and other Buildings in boggy Grounds: and it ſtands upon Record that there is a great deal of Alder uſed under our old Bridge at London, and under the Rialto at Venice.

There are thoſe who ſay Alder hardens by Degrees under Water, till it becomes a Kind of Stone, but this is falſe. It is ſufficient that it will laſt a vaſt while on theſe Occaſions; and it is plain from hence, that if a Supply of large Alder could be had for ſuch Works as are to remain under Water, there would be a ſufficient Demand for it: and this may be done on the Methods here laid down.

The Alder ſerves excellently for Piles of all Kinds, driven under Water; and Faggots of this Wood are excellent for laying in Trenches, cut through boggy Grounds to prevent their filling up. The Poles ſell well to the Hop Planters, and the ſmall Branches make an excellent Charcoal for Gun Powder.

The great Conſumption of the large and ſound Timber would be among the Turners. It is a very firm and light Wood, ſo that the Bowls, Diſhes, and the like made from it, would be preferable in that Reſpect to thoſe of Beech, and ſmoother and handſomer than thoſe of Elm, which are always harſh and ragged.

There is a Toughneſs in ſound Alder that will make it bear turning very thin; and it is worth the Conſideration of the Carver; anſwering freely to his Chiſſel, and yet holding together in very fine and ſmall Work.

A Plantation of Alder, beſide the Eaſe with which it is made; and its Readineſs to flouriſh where other Trees will not grow, has this Advantage, that the Leaves and young Shoots are ſo ill taſted, no Creature will crop them. So that it needs no Trouble or Expence in fencing.

I have named all theſe Advantages of the Alder, that more may be tempted to plant it than do at preſent. I have ſeen many a large Piece of Ground left waſte, on which Alders would thrive perfectly well; and which would by ſuch planting bring a vaſt Profit to the Owner.

CHAP. L.

Of the Willow.

THE Willow is another of the watery Trees, which, although frequent enough in ſome Places, is not nearly ſo much cultivated as it might be; and which, under a better Management than is generally beſtow'd upon it at preſent, would yield very great Advantages to the Owner.

The Willow, when the right Kind is choſen, and right Management is given it, grows to a conſiderably large and tall Tree. The Bark is pale colour'd, rough and cracked; the Wood light and whitiſh: the Leaves are long and narrow. The Flowers are ſmall, thready, and form'd into a Kind of Spike: the Fruit grows on other Trees of the ſame Kind, and contains a downy Seed.

There are ſeveral Kinds of Willow; but few of them are worth the Huſbandman's Notice, or Conſideration: the Ozier and the Sallow are properly of the Willow Kind, but theſe differing from the common Willow in many Reſpects, ſhall be treated of in ſeparate Chapters hereafter. Among the other Kinds the common tall Willow, or white Willow, which freely and naturally riſes into a Tree, and which the Farmers in ſome Places diſtinguiſh by the Name of the withy, is the principal in Value. Next to this is the large leav'd green Willow, which is generally kept a Pollard. And the others being all inferior to theſe two in Growth and Value of the Wood, are to be neglected.

The proper and natural Soil of the Willow is a damp rich Earth: near Waters, and in flat Grounds, is its favourite Situation. Of the two Kinds juſt mention'd, the white leav'd Willow, which naturally grows into a Tree, will do with leaſt Moiſture: the other, or green leav'd Kind, which is beſt kept for ſhrowding, loves the wetteſt Places. Let the Farmer keep this in his Remembrance always: for on theſe careful Diſtinctions, and the exact ſuiting of the Soil to the Kind of Tree, depends in a very great

Degree, the Advantage of one Perſon over another in his Plantations.

The Willow, of which ever Kind it is, is a Tree very eaſily propagated; for it will take Root in any Form, and under any Manner of planting whatſoever; and will thrive wherever there is Water. The white Willow will do even where there is but a moderate Quantity of Moiſture. It will thrive in clayey and loamy Soils, and will often riſe to a conſiderable Stature in Hedges, and on waſte Grounds, that are very far from any Water.

The common Way of propagating the Willow of either Kind is by cutting Poles of ten Foot long: theſe are to be ſtruck off one Way at the Bottom, and thruſt two Foot and a half deep into the Ground in moiſt Places. This is ſo eaſy and expeditious a Method, that few will ever be led to think of practiſing any other: and indeed none is better for the green Willow, which is intended for a Pollard, becauſe a little Advance in Height gives it the proper Length of Trunk, and the Shrowds naturally grow from the Top. But for raiſing Trees of the white Willow, or Withy, I altogether prefer the Method by Layers. Theſe are procured with the greateſt Eaſe, in the Manner directed under the Article Elm, only chuſing a wet Piece of Ground for the Stools; and being afterwards planted in deep Holes, as directed for the Alder, they take firm Root, and grow up with a ſurprizing Quickneſs. When theſe Trees ſtand on a moderately dry Soil, they quickly riſe to a ſound and good Timber, conſiſting of a large Blea, and a rediſh Heart, which is firm and beautiful, and bears a tolerable Price.

The beſt Time of planting the Willow is toward the End of February: and if the common Method by Poles or Truncheons be uſed, it will be proper to let them ſtand with the End in Water, that is to be thruſt into the Ground four or five Days before they are planted. The Diſtance ſhould be about fifteen Foot, and Care ſhould be taken not to rub up the Bark in thruſting the Stake into the Ground. The Careleſsneſs of the Planter in this Reſpect, has often prevented the Willows taking good Root, and this has been laid to the Charge of the Soil.

The common green Willow in the Pollard Form, is of ſo quick Growth in the Branches, that it may be cut once in four Years. The Seaſon for this is November or February, and one is as well as the other. But as this Tree is of ſuch ſpeedy Growth, it is alſo of quick Decay, and this is to be provided againſt.

A Plantation of Pollard Willows ſhould never be expected to ſtand longer than five and twenty Years; ſo that a freſh Supply ſhould be raiſed againſt that Time, by planting new Stakes or Truncheons between; and the old ones ſhould then be grub'd up while their Trunk is ſound; for ſoon after that Time, and often before, from Damages and Accidents, it grows hollow, and moulders away into a Kind of Touch-wood.

The Miſchief commonly begins at the Top, where the Wet gets in after cutting off the Shrowds, and ſo penetrates all the Way down.

The Pollard Trees of this Kind muſt be carried to a Height above the Reach of Cattle, before they are ſuffer'd to ſhoot for a Head, for they are very fond of cropping the young Shoots of this, though none of them will touch the Alder.

When the white Willow, or as ſome call it, the red Willow, from the Redneſs of its Heart, is to be raiſed for a Tree, the uſual Care is to be taken in trimming it up, to let no large Side Branches ſhoot; and to leave a few ſmall ones to call up and detain the Sap in the Trunk: by this Means it will riſe to a tall and well looking Tree.

This Kind, as well as the other, may be cut for ſhrowding, and either of them are of great Uſe this Way in Places where Fuel is ſcarce, for they yield a very great Quantity, and a quick Return. A Perſon who has but a moderate Number of them, by allotting them into four Diviſions, and cutting one Part every Year, may have an annual Supply.

The Willow is of great Uſe alſo in Hedges in proper Soils. The Stakes being made of this Wood, will all grow, and at once continue firm, and thicken the Hedge.

The Wood anſwers many of the Purpoſes of the Alder, and many others; the Poles make Hurdles and Fences, and Withs for the tying up of Faggots. They are uſed by the Thatchers inſtead of Hazel; and they burn into an excellent light Charcoal. For Quantity it has been computed, that an Acre of Ground properly planted with Willow, will at eleven Years Growth yield a Hundred Load of Wood. The large Wood is uſed by the Turners, and when good, brings a conſiderable Price. The worſt of it may be ſplit out into billetting, and burns excellently.

When the Willow is raiſed in a Tree, and has a long and ſound Trunk, it may be cut into Boards, and uſed in Building, for they are ſtrong, of a good Grain, and very beautiful.

CHAP. LI.

Of the Ozier.

THE Ozier is a ſmall Kind of Willow; which from the particular Uſes for which it is raiſed, requires a different Sort of Management, and another Manner of planting.

The Ozier very much reſembles the Willow in its Appearance, but that is a ſmaller Tree, its Shoots are longer and ſlenderer, and its Leaves alſo much longer, theſe are very narrow, and in the beſt Kind are green on the upper Side, but whitiſh, and as it were, woolly underneath.

The Ozier loves a wet and low Ground, near Waters, and nearly upon a Level with the Water. It thrives no where ſo well as in marſhy Places, near the Edges of large Rivers; or in thoſe little Iſlands that are form'd by the breaking of their Current, and every Way ſurrounded by the Water. The Ground for an Ozier Bed ſhould be a rich black Mould; and this is very common in theſe low and wet Situations.

The Deſign in planting the Ozier is, that it may ſhoot out a great Quantity of fine ſlender Twigs,

Twigs, which are to be cut at a ſmall Growth. Therefore there is no Occaſion for a Trunk either of the Pollard or Timber Tree Form. This would only exhauſt a great deal of the Nouriſhment taken in by the Root, and deprive the Shoots of it; neither are they ſo apt to riſe ſtrait and fine, unleſs they begin near the Ground.

On this depends the peculiar Way of planting the Ozier. It is rais'd in the ſame Manner as the other Willows, by Truncheons or Stakes driven into the Ground; and it is proper always to let a certain Quantity of the Shoots ſtand for a due Growth for this Purpoſe, when the reſt are cut. But as theſe are not to riſe in a Trunk, they muſt not be above four Foot in length, and three Foot of this muſt be thruſt into the Ground.

They will, by this Means, have a fine Supply of Roots; and beginning to ſhoot ſo near the Earth, all the Nouriſhment will be carried up into the Twigs.

Theſe Stakes are to be planted at three Foot diſtance, and they will quickly yield a large Profit: the Twigs riſe numerous from their Tops; and being cut down pretty cloſe, in the Manner of ſhrowding Pollard Trees, they ſend up a new Set of Twigs again almoſt immediately, which quickly grow to their proper Size.

The Time of cutting Oziers is in SEPTEMBER; and the Advantage that may be made of planting them is very great. Many waſte Pieces of wet Ground might be made to yield a great Profit by them.

If Stakes or Truncheons of a proper Bigneſs cannot be had, more Time will be requir'd to raiſe the Ozier Bed; but it may be done from ſmaller Sets. Theſe are to be cut four or five Foot long, and ſtuck at the ſame Diſtances into the Ground. They will grow very freely; and when they have ſtood three Years they are to be cut down, within a Foot of the Ground; and from thence will riſe the Twigs in great Abundance; and they will continue affording a Supply of them many Years.

The fineſt and beſt Kind of Ozier is that I have deſcribed with long Leaves, white underneath; but there are ſeveral others that anſwer the Purpoſe very well. The Twigs are of conſtant and ready Sale. The Baſket-maker's Work depends upon them; and there is a great Conſumption of them among the Fiſhermen. The Wheels, as they are called, for catching Eels and other Fiſh, are made of them: and Baſkets, Hampers, and the like, of which the Conſumption is, in a Manner, endleſs and unlimited.

The quick Growth of the Twigs is a great Article in the Profit of an Ozier Holt, for they are cut every Year; and the Heads that bear them grow for a long Time more and more buſhy at every cutting. So that here is a vaſt Profit to be made with ſcarce any Expence; annually returned and increaſed every Year; and this upon Ground fit for nothing elſe; for the Ozier will grow and flouriſh on Ground that is ſo looſe and ſo wet, that it would not afford Hold for the Root of any other Kind of Plantation whatſoever.

As the Stems of the Ozier will decay in Time, let the Huſbandman always take Care to have a Supply. Nothing is ſo eaſy: for 'tis only ſticking into the Ground ſome Twigs between the Stems, which will take their Time to root themſelves, and grow to a due Bigneſs; and when properly cut, and managed according to the Directions already given, of raiſing an Oſier Ground from Sets, will be ready to yield their Produce as the old ones begin to decay; and may thus be made to ſupply their Place gradually as they are wanted.

CHAP. LII.

Of the Sallow.

THE Sallow is alſo properly a Kind of Willow, but ſo far different in its Cultivation and Uſe, that it very properly falls under Conſideration in a diſtinct Chapter.

There are ſeveral Kinds of Sallow, as there are of Ozier; and all of them anſwer the ſame Purpoſes, in a more or leſs perfect Degree: but as I have mentioned which is the beſt Ozier, I ſhall, in the ſame Manner, acquaint the Huſbandman that the Kind of Sallow which will beſt anſwer his Care in raiſing, is that which has a roundiſh Leaf, of a pale whitiſh green Colour, and rough. This is common in Hedges, and it is from this he will do beſt to raiſe his Stock.

The proper Soil of the Sallow is a rich black Earth, where there is a tolerable Degree of Moiſture; and its moſt favourable Situation is in the damp Part of a Coppice, or in a Hedge Row in a flat Meadow, where there is a wet Ditch at the Bottom.

It is in theſe Places the Sallow riſes to its greateſt Perfection, but it is not confin'd to theſe, for it will grow in loamy or clayey Soils far from Water, and in almoſt any Situation.

The Advantage of planting the Sallow in its beſt and moſt favourable Soil is, that it grows very quick. It is an excellent Shrub to mix with white Thorn in Hedges, and in this Caſe it will be fit for cutting every four Years; ſo that it yields double the Wood of any other Kind in a Fence; and at the ſame Time improves and ſtrengthens it in every Reſpect.

The Sallow may be propagated in the ſame Manner as the Willow and Ozier, by ſticking Stakes or Truncheons of it into the Ground, which will grow without farther Trouble: but when it is ſet in a Hedge, the beſt Method is to plant the Sets with the white Thorn, and let them grow up together.

The Sets of Sallow may be planted on the oppoſite Side of the Bank from the white Thorn, of the Hedge; becauſe they will be fit to cut before the white Thorn is half grown.

If Sets are not in readineſs rais'd in the Manner of the white Thorn; Pieces of Sallow Twigs of a Yard long, and an Inch thick, may be let into the Bank ſlope-wiſe, at proper Diſtances; and they will grow very well. The beſt Method is to make an Hole with an Iron Crow, for if the Sallow Stake be thruſt in of itſelf, the Bark is often injured, and it will not grow.

Chalk and Sand are the only Soils on which the Sallow will not thrive. A loamy Earth in the Neighbourhood of Water, will make it puſh at a great Rate: faſter indeed than in pure Mould, becauſe

becauſe of the Warmth there is in the Sand, that is in this Kind of Soil, and the free Paſſage of the Water; but I have found by Experience, that the Wood is firmer and better when it grows on a good Mould.

The beſt Time for cutting the Sallow is early in Spring; for it then ſhoots out almoſt inſtantly on the cutting: and I am to adviſe the Huſbandman to uſe ſome Care and Caution in the Manner of doing it. It is a common Complaint that Sallow Stumps are not laſting: if this were true the Objection would not be of any great Force, they are ſo eaſily ſupplied; but it is the careleſs or ignorant Manner of cutting, that makes them decay. If the Shoots are ill cut, their Ends left long and ſtraggling, and haggled by a clumſy Workman, they will let in wet and decay the Stumps: but let them be cut off cloſe and ſmooth, and at a proper Seaſon, and the Sallow ſhall laſt as long as the Thorn.

The Quantity of Wood produced by the Sallow is of great Advantage to the Farmer, becauſe he always has it ready to make up, thicken and mend his Fences. The Poles of the Sallow are uſed to make Hurdles, and when they are larger they turn to yet better Account in making Rails, Rafters, and the like.

I have propoſed to the Huſbandman to raiſe the Alder into a Timber Tree, inſtead of letting it riſe in Poles, as is the Cuſtom; and the ſame Thing may be done with the Sallow.

Though we uſually ſee it as a low Shrub, it may be rais'd from Layers, in the Manner already directed for the Alder, and train'd up into a regular well-bodied Tree. In the damp Parts of the Woods it will grow among the other Timber. And Plants of it thus rais'd, may be left Standards in the felling of Coppices, while thoſe that grow in the uſual Way are cut with the reſt.

The Sallow, thus rais'd to a Tree, affords a firm and very tough Wood, that ſplits eaſily with the Grain, and may be uſed on a great many Occaſions in Country Building.

The Heart of the Sallow, when thus rais'd into a Tree, is red, like that of the Willow, and it is very firm: 'tis ſaid, that if kept dry it will laſt as long as the Oak; and I have ſeen Trees from which very large Beams of it might have been cut, ſome of them being fifty Foot high, and of a good Thickneſs.

No Shrub requires more Care to defend it from Cattle than the Sallow, in the common Way of raiſing it. For the young Shoots and Tops of the Branches are very ſweet, and they are very fond of them. The Value of the Wood, in this Way, conſiſts in the Length and Straitneſs of the Poles, which will often grow to ten or twelve Foot: they will naturally grow to this if uninjur'd, but the Cattles biting off the Tops makes them commonly grow buſhy, ſhort, and irregular.

It is beſt for the Stem, as before obſerved, to cut the Sallow Poles in Spring, but it is for the Advantage of the Wood to cut it in Winter, while the Sap is down. Therefore when the Poles are large, and likely to bring a Price from the Turner and Joiner, it is beſt to cut them in November; but when they are ſmall, and deſign'd for Fire Wood, or repairing of Fences, it is beſt to do it in Spring.

One great Advantage the Sallow has over moſt of the other Shrubs, whether in an Hedge or Coppice, which is, the Eaſe wherewith it thickens them in Places where there are Vacancies by laying down. A Pole of Sallow of ten Foot long, may be brought to the Ground by a Chop almoſt through, at the Bottom, and laid in a ſmall Trench opened for that Purpoſe; in this let it be peg'd down, and cover'd with Mould; and there will riſe a little Foreſt of Sallows from it; as many of which may be ſuffered to grow as are needful to the Occaſion.

In moſt Places where there are Sallows, the Ground ſeems to produce young Trees of the ſame Kind, as it were of itſelf, often at a conſiderable Diſtance from the old ones. Theſe riſe from the Seed; they may be taken up, and train'd to goodly Trees: but the Method by Layers is equally certain of Succeſs, and is proceeding with little Trouble and great Regularity.

CHAP. LIII.

Of the Fir Tree.

THE Fir is a Tree not native of this Country, but which may be propagated here with Advantage. Its many and great Uſes are ſufficiently known; and every Huſbandman muſt wiſh that he had it in his Power to raiſe it. How far that may be done profitably ſhall be ſhewn.

The Fir Tree is an ever-green; tall, ſtately, and of an extreamly regular and beautiful Growth. The Bark is of a pale rediſh brown, rough and crack'd in many Places: the Leaves are ſmall, ſlender, and grow in vaſt Abundance on every Part of the ſmall Branches: the Flower is a Kind of Catkin, and the Fruit grows on a different Part of the Tree. It is oblong, hard, and ſcaly, and is called a Fir Cone, and by the Vulgar a Pine Apple.

There are ſeveral Kinds of Fir in the Counties where that Tree is a Native; and a great many of them have been brought into our curious Gardens: but the Huſbandman who would plant Firs with a View to Advantage, muſt make Choice of that Kind which is called the Norway Fir, or Spruce Fir, which is the Sort that affords the fine Deals we have from that Country. This is called by Authors the common Fir, or the Pitch Tree; and is diſtinguiſhed from the others by the Smallneſs of the Leaf, and by the Fruit hanging down.

There are two or three other very hardy Kinds which have been long cultivated in ſome Parts of England, and may be worth his Notice, but the Kind juſt mentioned is the Standard and principal Sort.

The firſt of theſe others is that called the Cornish Fir. The Leaves of this grow like thoſe of the Yew Tree, and the Fruit is very long and hangs down. This was originally an American Tree, but ſome of them are planted, many Years ſince, in Devonshire, which ſtill live and thrive there exceedingly.

Two others are the ſmall con'd Fir, and the

the ſhort leav'd Fir, both theſe came over alſo from AMERICA, but there are many Trees of them in DEVONSHIRE and CORNWALL, where they were long ſince planted, and where they ſtand, and have grown to a great Size. There are alſo ſome other Kinds that will bear our Climate very well: but as the firſt named Species is the moſt immediately to the Planter's Purpoſe, it is that he is principally to have in View.

As to the others, he may do well to mix ſome of them among his Plantations of that Species, to ſee the different Succeſs, as this Kind of planting is but new yet in ENGLAND, with a View to Uſe. Perhaps in ſome Places one of the AMERICAN Firs may ſucceed where the NORWAY Kind would not; in that Caſe it will be right to raiſe ſuch, and try their Value at the Market.

The beſt Soil for Fir Trees is a barren, poor, ſtony, or gravelly Land, where there is Clay at the Bottom; and their moſt favourable Situation is on the Tops and Sides of Hills. This alone would be a very ſufficient Reaſon for the Huſbandman's undertaking to cultivate them in ENGLAND, becauſe there is a great deal of ſuch Ground that is waſte with us, for want of proper Growths. Though we hope one good Conſequence of this Work, will be the remedying that Evil, becauſe there are propoſed in it valuable Kinds for every Soil and Situation in the Kingdom; ſo that no Inch of Land need be left waſte, except by the Careleſsneſs of the Owner.

But though a ſtony Soil with a Clay Bottom be the beſt for the Fir Tree, it is not the only Kind in which they will thrive. Firs of vaſt Bulk grow both in NORWAY and in NORTH AMERICA, on cold Clay, and many other Soils, as well as in lower Situations: on chalky Hills alſo it thrives excellently. This Tree does not ſucceed in very looſe or light ſandy Soils, nor in the rich mellow Earth, where there is little or no Admixture, but in almoſt any other it will thrive more or leſs, and yield a large Profit to the Planter.

There are ſeveral Plantations of them in different Counties, where they grow well on different Soils; but by Obſervation, and examining the Ground, I have conſtantly found that they ſucceed the beſt where there is a Clay at the Bottom; and where they ſtand expos'd as open upon hilly Grounds or Commons.

Nature produces a great Part of the Firs on cold rocky Mountains: we ſee by thoſe Examples already cited, that it is a Tree which will grow in this Country: we have enough of theſe rocky and bleak Hills of little Value in the Kingdom; what therefore can be ſo reaſonable as to try whether this Tree may not be planted upon them to Advantage.

The Fir Tree is to be raiſed from Seeds, and as this requires a different Management from the rearing any of our own Trees, I ſhall, for the perfect Information of the Huſbandman, here ſet it down at large.

Let the Fruit, or Cones, be gather'd when perfectly ripe, from a large and well growing Tree: and ſpread upon the Floor of a dry airy Room. There let them lie all Winter.

In the firſt Week of MARCH prepare the Ground by plowing two or three Times, which will improve the Soil, and thoroughly deſtroy the Roots of all pernicious Weeds.

When this is done, let a ſmall Spot of two Foot wide be better broke and levelled with a Spade at every ten Foot Diſtance; and while this is doing, let the Seeds be got out of the Fruit, or Cones, that have lain the Winter drying. This is to be done by ſoaking them, they are to be thrown into a large Tub of River Water over Night, and taken out in the Morning; at which Time the ſeveral Cells they contain will readily open, and the Seeds may be taken out.

On each Spot of the Earth levelled and prepared by the Spade, let there be ſown half a Dozen good Seeds. Let them be cover'd about an Inch with Mould; and let a little Piece of a Furze, or black Thorn Buſh, be laid over them by way of Defence. This will keep the Birds off; and will alſo make the Ground a little moiſt, which will promote their ſhooting.

When the young Trees appear, the Furze Buſh is to be taken off, and that and two or three others ſtuck in the Ground round about each Spot; this will ſerve to keep off the Sun and Winds, as well as other Enemies to young Plantations.

Three or four Plants will naturally riſe in each Spot. When they are at a little Height, the Earth ſhould be drawn up about the Stem, and thus they are to remain three Years, laying ſome looſe Stuff of any Kind about them, to keep the Ground moiſt and warm.

At three Years Growth all the Plants of each Spot are to be taken up, except one: the faireſt and ſtrongeſt is to be left, and great Care is to be had not to diſturb its Roots in raiſing up the others, and to ſettle the Earth about it when they are gone.

Thoſe which are taken up may be planted out in other Ground; and the ſingle vigorous and thriving ones left in their proper Places, will then grow up apace into a beautiful Plantation. Their Nearneſs will naturally prevent their ſpreading into a great Quantity of Side Branches; they will run up in Height, and with a little Care, form a very beautiful Plantation of Evergreens: a great Ornament to the Place.

A little Litter ſhould be ſtrew'd about the Roots, which will keep the Ground moiſt, and anſwer the Purpoſe of watering. If any Water be neceſſary, it muſt be given in ſmall Quantities, eſpecially to thoſe Trees which are tranſplanted: for many have been deſtroy'd by it, Practice when too much is given.

In this Manner a Plantation of Firs may be raiſed with great Eaſe, and it will flouriſh without any farther Care, on chalky or ſtony Soils; and on clayey ones that are not too wet; and beſt of all upon thoſe Hills where the Huſbandman finds it moſt difficult to make any uſeful Growth thrive.

They will be a vaſt Beauty to the Country; and the Profits ariſing from them when they are well underſtood, cannot fail to be very great.

They ſeem ſlow in their Growth while young:

but let not that diſhearten the Planter; for it is only during a few of the firſt Years. After the firſt ſix or ſeven Seaſons they ſhoot up at a great Rate; and increaſe in Bulk in Proportion. Fir Trees in ENGLAND have riſen to ſixty Foot Height, and a proportionable Bulk of Body in twenty Years. At about thirty Years they will be fit for felling for all the common Uſes of Building, and if the faireſt and ſtatelieſt Trees be ſuffer'd to ſtand ten or twelve Years longer, they will be fit for the Service of the Navy, or any other Offices that require the large and fine Deals.

Of all Parts of the Kingdom one would moſt wiſh to ſee theſe Plantations made about the Coaſts, where the Demand would be always great for the Timber; but in every Place Deal is ſo uſeful a Wood, that it could never want a Market. It is unqueſtionable but that we might raiſe theſe Trees ſo as to ſupply Maſts to our Veſſels, and every other Purpoſe for which ſo much of this Timber is annually imported at ſo large a Price, and which grows upon juſt ſuch Hills as we all the Time leave deſolate and uncultivated.

Deal is in a Manner an univerſal Wood in Building. Our Wainſcots, Floors, and other Parts of the Houſe are made of it; it is very laſting when kept dry, and 'tis no little Advantage to the Carver and the Joiner, whoſe ſeveral Purpoſes it excellently anſwers, that it takes Glue particularly well. It would be endleſs to recount the other common Uſes of Deal, and needleſs, all Perſons knowing them. It is ſufficient that I have ſhewn the Tree which affords that valuable Wood, may be raiſed in ENGLAND with Eaſe and great Advantage. It will be wonderful if ſome of thoſe many Perſons who have waſte Lands on a proper Soil and Situation for this Purpoſe, do not begin: and then the Advantage will ſoon make the Practice univerſal.

CHAP. LIV.

Of the Pine Tree.

THE Reader will naturally wonder why among the ſeveral Kinds of Fir Tree fit to be planted in ENGLAND, I have not named the Scotch Fir. But the preſent Chapter, and not the preceeding, is its proper Place. The Pines and Firs differ by very obvious Characters; and the Scotch Fir, as it is called, is truly not one of Fir, but of the Pine Kind.

The Pine reſembles the Fir in many general Reſpects, but the great Article of the Diſtinction is this, the Leaves of the Fir are ſhort, and grow ſingly from the Branches; though in great Quantities, and near one another; but the Leaves of the Pine are long, and they grow always two together out of a Kind of Sheath or Caſe.

This is the Diſtinction which all Authors have eſtabliſh'd between the Fir and the Pine; and according to this it is very evident, that what is called the Scotch Fir, is one of the Pines, and not of the Fir Kind. Whoever has ſeen a Pine and a Fir, will alſo recollect that the very Appearance of the Scotch Kind is that of the Pine, and not that of the Fir Sort; ſo that the Name is only a vulgar Error.

There are ſeveral Kinds of the Pine Tree rais'd in our Nurſeries; but thoſe worth the Huſbandman's Regard are principally three; the common Pine, the wild Pine, and that called the Scotch Fir. They all bear Cones for Fruit, reſembling thoſe of the Fir, which from that obtain'd the Name of Pine Apples; but the Scotch Kind is diſtinguiſh'd from the reſt by the Smallneſs and Whiteneſs of its Cones. Its Leaves alſo, tho' longer than thoſe of the Fir, are ſhort in Reſpect of others of the Pine Kind.

Theſe three Sorts all delight in a ſtony or chalky Soil, with an elevated Situation. They will grow in the ſame Soils, and on the ſame Kind of Hills with the Firs, and there is no Doubt but that Plantations of them might be made, with the greateſt Succeſs, in many Parts of ENGLAND. We ſee them thrive very well in ſome Places, where they have been raiſed within the laſt twenty Years; and if they have failed in others, it is altogether owing to the Ignorance of thoſe who undertook the Buſineſs. There are ſome Soils which will not ſuit them; and if they are againſt Nature planted in theſe, they muſt either periſh, or at the beſt keep barely alive, without flouriſhing.

As the Soil which agrees with the Pine, is the ſame with that fit for the Fir; and the Fruit is alſo of the ſame Kind: the ſame Method of raiſing theſe Trees is to be uſed as was deſcribed in the laſt Chapter for the Firs, therefore there needs not be a Repetition of any Part of it in this Place.

Beſide the Uſes of theſe Trees as Timber, there is another Advantage to be conſider'd in Reſpect of them; which is that Quantity of Pitch, Tar, Roſin and Turpentine, which they yield, and of which there is a vaſt Profit made in FRANCE, and many other Kingdoms.

We have Soils and Situations fit to raiſe them, and the Manner of doing it is very eaſy, and has been here laid down at large. There can be no Doubt of ſuch a Plantation anſwering to the Expence and Trouble, were there none of theſe Advantages: but when it is found that they thrive here, and we have Plenty of them of a proper Growth, it will be very well worth while to try, whether or not theſe ſeveral valuable Articles of Commerce, may not be procured from them here as well as elſewhere. The Methods by which they are obtain'd are very eaſy: they are deliver'd at large in many Books; and in Caſe of Difficulties, it would be eaſy to bring over Workmen from the Places where they are conſtantly made, to enſure the Succeſs. This may be underſtood as a remote Conſideration; and it is therefore I do not enter upon it more at large here: but the general Method is ſo eaſy, and may be expreſſed in ſo few Words, that 'twere pity to omit it. They cut down thro' the Bark off the Pine Trees in Spring, and there runs a clear Roſin in great Quantities. They ſtrain this, and the fine Part is what we call common Turpentine, of which there is a vaſt Conſumption among Farriers, and many other Trades. The coarſe Part is diſtilled with Water, for Oil of Turpentine, and what remains in the

the Still is common Roſin. The Pitch and Tar are made by burning the Wood in a cloſe Place, which they cover up while burning, and the Juice which runs out in vaſt Quantities is Tar; and when it is boiled up to a Thickneſs it is Pitch.

Nothing can be eaſier than all this, appears in the Deſcription, and Experience only can ſhew, whether it may not be as eaſy as advantageous in the Practice. If one Set of theſe Products could not be obtain'd from the Pine Tree rais'd in England, the other might: if there could be a Difficulty about the Roſin or Turpentine, there can be none about the Tar and Pitch. That they may be made here is beyond a Queſtion, and they are of ſufficient Value to make it well worth a Trial.

CHAP. LV.

Of the Juniper.

AFTER the mention of theſe tall reſinous Trees, it may not be improper to introduce a low Shrub, which is in ſome Degree of their Nature, and which is a Native of our Country, the Juniper. I ſhall not ſpeak of it as a Kind that can be made to yield any very great Profits; but we ſee that it naturally grows on our worſt Ground, ſuch as the barreneſt of our Heaths, and nothing could be ſo eaſy as to plant ſuch Places entirely with it. There can be no Doubt of its growing and thriving there, becauſe it does that naturally; and if there be among theſe Grounds, any that cannot be put to a better Uſe, it will certainly be an Advantage to raiſe this upon them, rather than to let them lie abſolutely waſte and deſolate.

The Juniper, although a ſmall Shrub in England, riſes to a conſiderably large Tree in ſome other Parts of Europe, and it would be worth while to raiſe it from Seeds of thoſe Trees, carefully gather'd for that Purpoſe, and ſee whether we could not then get it to the ſame Stature on our Heaths and Commons.

The Bark is of a reddiſh brown, and ſmooth; the Leaves are ſmall and narrow, of a fine bright green, and prickly. The Flowers are ſmall and inconſiderable; the Fruit is a round Berry: it grows on a different Part of the Tree from the Flower, and is ſoft and pulpy, with three Seeds within.

The natural Soil of the Juniper is a light, looſe, and ſandy Earth, it will grow on this though it be very barren; and will bear any Expoſure; but it ſucceeds beſt where there is a firm Bed under the Soil.

It is propagated from the Berry, which takes very readily, and ſhoots quickly; and with a little Care at firſt, will be ſoon out of the Way of any Accident.

I would adviſe the Huſbandman who ſhould think of ſuch a Plantation, to get ſome Correſpondent to have a Parcel of Berries gather'd from the large Tree Junipers abroad, and carefully ſent over.

The Ground ſhould be broken with two good Plowings; and in the Beginning of March, the Berries ſhould be ſown on it pretty thick, harrowing them well in. They will lie in the Earth till the next Spring; ſo that at proper Times a Perſon ſhould be employ'd to go over the Land, and weed it carefully: when they begin to appear, it will be of great Uſe to ſprinkle ſome Furze Buſhes over the Ground by way of Shelter and Defence, removing them as the Plants grow up.

The next Spring the young Plants ſhould be thin'd, and left at about four Foot Diſtance; and after this Time they may take their Chance, for they are hardy enough to ſhift for themſelves: only that at the End of one Year more, the Huſbandman ſhould go over his Ground, and cut down about half of them within five Inches of the Earth, leaving the faireſt and beſt growing Plants ſtanding entire. By this Means he will have a very beautiful Evergreen Plantation, part Shrub, part Tree, and after a little Time he may ſend People annually to gather the Berries; which, if the Soil and Situation favour the Trees, will be produced in conſiderable Plenty, and will always bring a ready Price from the Diſtiller or Druggiſt.

The Wood of the Juniper, when it grows to any Size, is of conſiderable Value. It is yellow, of a fine cloſe Grain, and extreamly tough. It has a very fragrant Smell, in ſome Degree reſembling that of Cedar; from which many People have been led to call the Junipers of the different Parts of the World, Cedars. The Virginian Cedar, the Bermudas Cedar, and the like, being really no other than Junipers.

The Juniper Wood is excellent for Turning, Carving, and many of the finer and more delicate Uſes. When large enough, its Grain is ſo beautiful, as well as its Colour, that the Cabinet-makers would be ready enough to purchaſe it at a good Price.

Upon the whole; the Cultivation of the Juniper is ſo eaſy, and the Ground on which it would grow is ſo cheap, that it muſt be very well worth while to try at the raiſing it to a conſiderable Value, of which there is a very fair Proſpect, ſince there is a Certainty of its ſufficiently anſwering the Expence and Trouble.

CHAP. LVI.

Of the Yew Tree.

THE Yew is a Tree like the Juniper, of leſs Value, and leſs frequent Uſe than the Generality of thoſe that have been ſpoken of; but which will in the ſame Manner grow in Places where Trees of more Value cannot find Nouriſhment, and is therefore very well worth the Notice of the Huſbandman.

It is an Evergreen Tree, which, when ſuffer'd to grow at large in a favourable Soil, will ariſe to a conſiderable Height, and a proportion'd Bulk of Body, but without any great Beauty or Regularity in its Branches. The Bark is of a pale reddiſh Colour, as is alſo the Wood: the Leaves are of a very dark blackiſh green: the Flowers are ſmall and inconſiderable, and the Berry ſtands in a red juicy Cup,

ſo

ſo that it, in ſome Degree, has the Appearance of an Acorn in Miniature.

The Uſe of the Yew in Gardens is well known. Though we no longer allow of the cutting it into Peacocks and Giants, it is in Credit for Hedges which are very thick, and an excellent Defence for the tenderer Growth in the Quarters. But the Huſbandman is to conſider the Yew in another Light; as it may anſwer his Purpoſe in the Fields where it is to ſtand for Timber, without any Regard to its Form.

We find the Yew Tree naturally wild on many of our moſt barren Hills, particularly in Sussex and Hampshire; and in ſuch Places it may be very well worth while to multiply it; for it will thrive perfectly well in the moſt barren Soils; and on the moſt expoſed Places; and after ſtanding a ſufficient Time, for it is not a ſlow Grower, it will yield a very conſiderable Profit.

The common Practice of our Nurſerymen is to raiſe the Yew in ſmall Beds from the Seed, whence they remove it at two Years old to greater Diſtances; and thence, after three or four Years Growth in the new Soil, they tranſplant it into the Gardens, where it is to remain: but the Huſbandman is not to be guided by the Nurſery in his raiſing of Trees. This Method may do very well when the Yews are to be removed into a rich Ground; but as he is to make his Plantations on very bad Soils, he muſt raiſe his Trees on the Spot.

For this Purpoſe let him gather Yew Berries when ripe, from large and tall Trees; and employ People to open the Ground at every ſix or ſeven Foot, where he intends his Plantation.

In each of theſe Holes, thus dug, he muſt ſow eight or ten of the Berries, with the red juicy Part about them; and throwing a Piece of Furze Buſh over every Hole, he is to leave them to take their Chance. They will riſe very freely, and all he will have to do afterward is to pull up the leaſt promiſing of them, till only one Plant is left in each Place. Theſe he ſhould go over every Spring, trimming off the Side Branches, and training them up, as much as poſſible, for a ſingle Trunk.

The Yew wants this Care as much as any Tree whatſoever, for it is apt to ſpread and branch out from the loweſt Parts of the Trunk; and when it takes this Growth it becomes buſhy, and has no Height of Body. It is owing to this, and to the favouring the ſpreading Growth of this Tree in Gardens and Nurſeries, that we ſo rarely ſee a Piece of tolerably large Yew Timber. Here and there an old Tree, that has ſtood at the Head or Foot of ſome Grave in a Church-yard, takes its own Courſe into a tolerable Trunk; Boys cuting off its lower Branches. Otherwiſe we rarely meet with it, and never in the Perfection that it might be brought to with due Care.

The Wood of the Yew Tree is extreamly firm and beautiful: it is generally vein'd with great Elegance, and is capable of a fine Poliſh. Bows were, in old Time, made of it: at preſent it ſometimes ſupplies the Place of Lignum Vitæ, in Bowls, and is greatly admired in whatever Form 'tis met with.

Where large Trees of it have been cut down, People upon the Spot have, in Curioſity, had Tables or other Pieces of Furniture made of it, and they have always been admir'd by all who ſaw them.

The Yew affords a Timber, the Uſes of which are but little known; however, if it were any where ſo rais'd that it could be had in Plenty, and of a good Size and regular Growth, Uſes enough would be found for it. The more irregular Pieces would be employed by the Wheel-wright and Mill-wright, and would make Poſts, and many of the Country Utenſils; and the regular and even Parts would bear a Price with the Cabinet-maker and Turner; being ſuperior, in all Reſpects, to a great many Kinds which they conſtantly uſe, and which they buy at a large Price.

CHAP. LVII.

Of the Box.

WE are deſcending to the Conſideration of Trees of much leſs Value than thoſe named in the firſt Chapters, but they are ſtill ſuch as have their Uſe, though leſs conſiderable, and from certain Circumſtances of their Growth they may be worth the Huſbandman's Notice, ſince he may often raiſe them to Advantage.

The Box is a very little Tree, its Bark is yelloviſh, its Wood very firm, and alſo yellow; the Leaves are each compoſed of ſeveral ſmaller, ſet on the two Sides of a middle Rib, and theſe are roundiſh, of a dark Green, and continue all the Winter: the Flowers are ſmall and inconſiderable, the Fruit grows on another Part of the Tree, and is divided into three Portions, containing two Seeds in each Diviſion.

We uſually diſtinguiſh two Kinds of Box, a Dwarf Sort that is us'd to ſet round Borders in Gardens, and one that is taller, called the Tree Box. This laſt is the only Kind worth the Huſbandman's Notice. Beſide theſe two, there is a narrow-leav'd Species; but its Timber is not ſo fine as that of the common Sort; though the Difference be not great in this Reſpect, any more than in their outward Appearance.

The Box loves a poor Soil, and a bleak Expoſure. It will grow upon the barreneſt and worſt of our Lands, whether they be ſtony, chalky, or of whatever other Kind. So that there are many Places where nothing better will grow, and where it may be uſeful to raiſe it.

The common Way of propagating Box in our Nurſeries is from Cuttings, which they keep well ſhaded and water'd, till they take Root; but this is not the Practice to be obſerved by the Huſbandman who would have this Tree on his barren Grounds.

He may raiſe it from Seed, and that muſt be done upon the Spot, in the ſame Manner as has been juſt directed for the Yew, or he may plant it from Layers, as directed of the Elm. Theſe take Root freely enough. If the Ground have any Richneſs, this is the beſt Method; but where that is very poor the Way from Seed is to be prefer'd.

Which ever Way they are rais'd, the Huſbandman muſt go over his young Plantation once a Year, to take off the large Side Shoots, and train

train up his young Trees to a Trunk. They will by this Management, riſe to an Height and Bigneſs, of which they would have no Imagination who had not ſeen them when they grow freely, as on Boxhill in Kent, and ſome other Places; but in theſe they do not arrive at that Height and Value they will do when train'd for it from the Beginning.

The Wood of the Box, when of any tolerable Size, is of conſiderable Value; and when rais'd to the Bigneſs and Regularity that it would attain, by the proper Methods here directed, few have any Notion of the Price it would bring. It is the heavieſt of all our English Woods, and one of the firmeſt and hardeſt: its Colour is very beautiful, and the Grain fine. It is uſed at preſent for the making of Mathematical Inſtruments, and many other Things that require Strength and Firmneſs in a ſmall Body, as Combs and the like. The Turner alſo is glad of it on many Occaſions; and would be on many more if he could have it of a Size for his larger Works; and this would eaſily be brought about, by the proper training of it up, and giving it Time for the Growth into a well-bodied and regular Tree.

CHAP. LVIII.

Of the Cypreſs Tree.

THE Cypreſs is another of thoſe Trees which, though at preſent confin'd in a Manner to the Garden, might be brought out into the Field with Advantage; and which, though not ſo large as many others, is very valuable.

The Cypreſs is an handſome Tree, and when the right Kind is planted, arrives at a conſiderable Size. The Leaves are flat, and as it were ſcaly; the Bark is uneven and brown, the Flowers are ſmall and inconſiderable, and ſtand at the Ends of the Branches; the Fruit grows on other Parts of the Tree, and is roundiſh, hard, and woody: it cracks when it is ripe, and contains in its different Diviſions ſeveral hard Seeds.

There are two Kinds of the Cypreſs Tree, one which naturally grows up erect, and the other which ſpreads its Branches. The ſecond, which is known by the Name of the ſpreading or the male Cypreſs Tree, is to be prefer'd. There is beſide theſe another very unlike them, except in the Fruit: it is brought from America, and loſes its Leaves in the Winter, whereas the others are green all the Year. This is not worth the Huſbandman's Notice; the Wood of the ſpreading or male Cypreſs, being greatly preferable to that of any of the others.

The proper Soil for the Cypreſs is a warm Gravel: it will grow on ſandy Grounds, but does not thrive ſo well as in the other, among which there is uſually a Mixture of loamy or marly Earth.

It ſucceeds beſt in an elevated Situation, but ſhould not be planted on entirely expoſed Places; on the Side of an Hill, where there are Springs at a moderate Depth, and where there is the Defence of Hedges or Trees, it will thrive excellently. There are many Pieces of Ground of this Kind, on which at preſent nothing of any Value grows, which would carry up the Male Cypreſs to great Value.

This is one of thoſe Trees ſo utterly neglected, that 'tis hard to ſay what is its Value; but the Eſteem in which its Timber is held in other Countries at preſent, and the Value that was ſet upon it in earlier Ages, ſhews very plainly that 'tis not without a Title to the Huſbandman's Care.

The Cypreſs is to be propagated by ſowing the Seeds; and to this Purpoſe the Huſbandman's firſt Care ſhould be to get them good, which he will not eaſily do in England, for though theſe Trees bear Fruit with us, it does not ripen perfectly.

I would adviſe the Planter of Cypreſs therefore to procure ſome well ripen'd Fruit from Italy, and to ſow the Seeds with due Care in his Ground.

In the firſt Place, the Fruit is to be laid at a Diſtance before the Fire, till warm through, upon which the Cells will begin to open, and the Seeds may eaſily be pick'd out. But Care muſt be taken that the Heat be not too great, becauſe that would deſtroy their Power of Growth.

Theſe are to be ſown in the Middle of March, upon the Ground where they are to ſtand, Spots being dug and prepar'd at ſeven Foot Diſtance for that Purpoſe.

Ten or a dozen Seeds are to be ſown in each Spot, and when they are come up, and have advanced a little in Growth, the young Plants are to be pull'd up, till only the one flouriſhing Shoot be left in each Spot. Theſe are to be train'd up for Timber, by cutting off the ſpreading Branches with Moderation, for the Tree naturally ſpreads, and too much Violence muſt not be done to that general Form of growing, leſt it be ſpoil'd.

Little Care is requir'd after the Trees are once eſtabliſhed, but they take Time; for the Cypreſs is not one of the quick Growers.

The Timber of the Cypreſs is of great Value, its Texture is cloſe, and 'tis of a firm Body and fine Grain. It is excellent for Cheſts for keeping of Cloaths, the Moth never coming near it; and no Wood whatſoever is more durable, perhaps none ſo much. It was antiently a Cuſtom to bury in Cypreſs Coffins. And they laſted ſurprizingly. The Wood is undoubtedly excellent for many Uſes, and there only wants a Supply of it. The Turner, the Cabinet-maker, and the Joiner would ſoon find Uſes enough for it, if it were once brought to the Market, for it is greatly preferable to many of the Foreign Woods, which they purchaſe at a very conſiderable Price. And the worſt Pieces of it would be fit to be employed on all the common Occaſions, in which Strength and Durability were requir'd, for it will ſtand wet or dry beyond almoſt any other Wood.

CHAP. LIX.

Of the Cedar.

THE Cedar is another of the Trees which, though rais'd among us only as an Ornament to Gardens, might be very well cultivated abroad in Fields, in proper Places, for the Value of its Timber; the Value of which is ſufficiently known.

Several Trees, as has been already obſerved under the Article Juniper, are called Cedars, which are of that Kind, bearing Berries, and the moſt of them riſing but to ſmall Heights; but by the Cedar is here meant that large beautiful and ſpreading Tree, which is commonly known in England by that Name, among Gardiners and others, and is diſtinguiſhed farther by the Name of Cedar of Lebanon.

This is a large and ſtately Tree, with remarkably ſpreading Branches, ſtanding out almoſt flat from the Trunk, and often drooping. The Bark is rough and of a rediſh brown, the Leaves are very narrow, and grow many together in a Tuft, ſo as to reſemble a Pencil: the Flowers are a Kind of Catkins: the Fruit grows on another Part of the Tree, and is a large and beautiful Cone.

The natural Soil and Situation of the Cedar are ſtony and mountainous, nor will it refuſe to live in the coldeſt and bleakeſt Expoſures. The Place where it once grow in the greateſt Abundance of any where in the World, and from whence it has, for many Ages, had its Name, gives Proof of this; for it ſtood in the moſt thriving Condition, on thoſe Parts of Mount Lebanus which are, in a Manner, all Rock, which are expoſed without the leaſt Shelter, and where the Snow lies to a conſiderable Depth almoſt throughout the Year.

We have many barren, bleak, and rocky Hills in England, on any of which it will grow, to which it will be a ſingular Ornament, and where it will yield a very great Profit to the Owner. I hope that one of the Benefits attending this Publication will be, the leading People who have theſe barren Lands, that have lain ſo many Ages waſte, to plant them with ſome uſeful Product. The Cedar is ſo peculiarly fitted for this Purpoſe, that there is no Soil ſo poor as to be too bad for it; and that it will not thrive ſo well on ſuch as is better. Sandy, gravelly, and ſtony Ground, which will give Nouriſhment to nothing elſe, ſupport the Cedar, and raiſe it, in a very moderate Time, to a large and valuable Tree, for though, in general, the Trees which live in watery Places are the quickeſt Growers, the Cedar, though it love theſe dry and barren Soils, is far from being one of thoſe that ſhould be called ſlow.

But though this be the proper Soil of the Cedar, and that wherein it thrives beſt, there is ſcarce any in which it will not live. Cedars are ſeen flouriſhing in the loweſt Grounds, and in Soils abſolutely boggy, in ſeveral Parts of the World: but in theſe they grow very ſlowly and irregularly; and their Timber, when examined, has not its true Fragrance or Beauty; nor its proper Firmneſs.

The Cedar is to be rais'd from Seed, and that ſhould be done on the Places where it is to ſtand when it is thus rais'd for Timber; for the Soils I have directed for it are ſo poor, that a Plant removed into them from any other would have an ill Chance to thrive.

The Cones of the Cedar are to be had from Abroad; there are many of them brought every Year from the Levant, and to be had in London. To get out the Seeds an Iron Spike muſt be driven through the Cone lengthwiſe; this rends and ſeparates its Parts, forcing them ſo from their Lodgments, that they may be pick'd out with the Fingers.

Theſe Seeds are to be ſown early in the Spring, ſix or eight on each Spot where a Tree is intended to ſtand, and theſe Spots ſhould be prepared at five and thirty Foot Diſtance.

A Piece of Furze Buſh ſhould be laid over the Place; and kept there till the young Plants which have riſen from the Seeds are of ſome Height. Then they are all to be taken up, except one, leaving the faireſt and moſt thriving; and to train this up ſtrait a Pole muſt be ſet in the Ground near it, and the leading Shoot gently ty'd to the Pole as it grows. This is particularly neceſſary to the Cedar, which is apt to incline to one Side in its growing.

The young Trees being thus ſecur'd for Straitneſs, are to be left to Nature. They will grow but ſlowly at firſt; but very ſoon after they have arriv'd at a good Fixture in the Ground, they make amends for it, by a ſpeedy ſhooting up; they are not to be train'd for Height in the uſual Manner, by cutting off the Side Branches: for the lopping of all reſinous Trees is prejudicial in the higheſt Degree, and of none more than the Cedar. Therefore when it is thus carried ſtrait in the leading Shoot, by tying it up, the reſt are to be left to Nature, and although a great many large and ſpreading Branches are found on every Side, the Trunk will be ſufficiently nouriſhed, and will riſe to ſuch an Height and Thickneſs, as to yield Timber fit for all the Purpoſes to which ſuch Wood can be uſed.

It is very ſingular, that as the worſt Soils, ſo the hardeſt Seaſons agree better with this Tree, than ſuch as are richer or milder. The Cedar does not always ripen its Fruit with us, but an hard Winter is always found to promote its doing this. It is therefore evident that the Severity of the Cold is of Aſſiſtance to the Cedar, giving it Strength and Vigour.

This may be a farther Inducement to our Huſbandmen and Owners of bleak, barren, and expoſed Land, to plant the Cedar on it, for where a Tree ripens its Fruit preferably to other Places, there doubtleſs it will be more certain and ſecure to ſucceed in a Plantation.

The Size to which the Cedar will grow before it begins to decay, is very conſiderable. We find in Maundrell's Travels, that there are at this Time on Mount Lebanus, Cedars that appear to be quite ſound, and are between thirty and forty Foot in Circumference in the Trunk; if we could raiſe them to any thing like this in

ENGLAND, the Value they would have is eaſily known.

The Wood of the Cedar is of a beautiful rediſh Colour, and of a fragrant Smell. It is ſufficiently ſtrong, but is liable to ſplit; Care therefore is to be taken in the working it; but when wrought it endures for ever. This is its great Quality; and while it remains entire itſelf, it preſerves alſo what is kept in the Cheſts made of it; no Moth or miſchievous Inſect ever coming into them. We read in the old Authors, aſtoniſhing Accounts of the Duration of this Wood; and by many certain Inſtances we are led to put more Faith in thoſe Relations, than it would be natural to do without Experience.

The Size to which we read of their growing is alſo countenanced by what we ſee at preſent. A Man would ſtart at the Account of a Cedar eighteen Foot in Diameter, and a hundred and thirty in Length, had he not read of that juſt mentioned by MAUNDRELL, and which is to be ſeen by the Curious at this Hour.

There is no doubt but this Tree may be rais'd in ENGLAND in any Quantity, nor can there be any Queſtion of a Demand for the Timber, and that at a very conſiderable Price, as ſoon as it ſhould be regularly brought to Market.

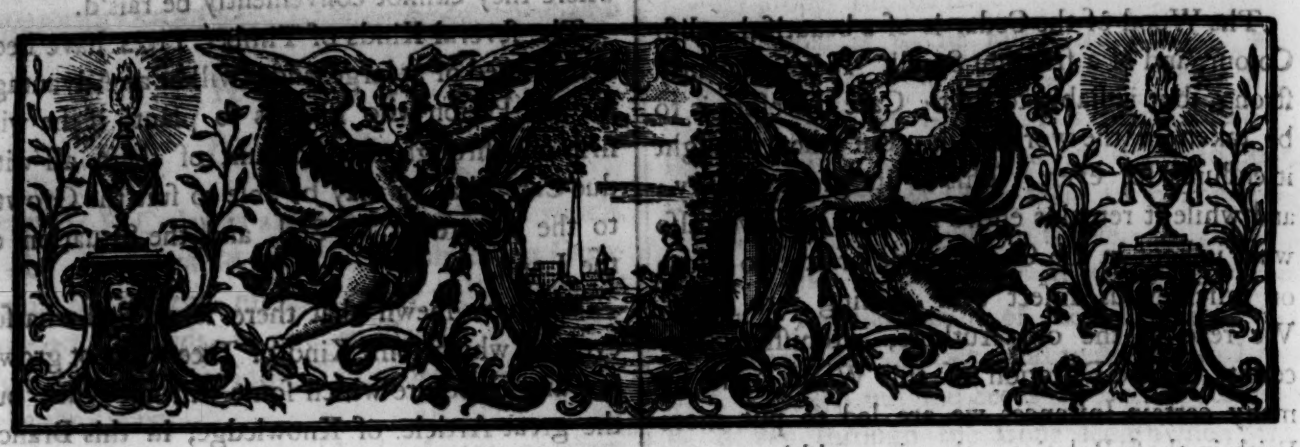
Upon the whole, it may not be improper to conclude the preſent Part of our Work with this ſhort Obſervation on the planting Timber; that in many Caſes it is preferable to any other Growth, even upon Land that will bear any thing: but in general, the great Advantage to be made from it, will ariſe from the progagating it in Places where other Things will not grow, or in Spots where they cannot conveniently be rais'd.

The ſeveral Kinds of Timber Trees have been here treated of at large, and it will be an Advantage for the Perſon who intends to plant, if he will firſt go through the Account of them all with due Care, that he may be able to ſuit the Growth to the Nature of his Soil, and the Situation of the Land.

We have ſhewn that there is no Soil whatſoever, on which ſome Kind of Tree will not grow; nor any Expoſure which ſome will not bear: but the great Article of Knowledge, in this Branch of the Huſbandman's Buſineſs, conſiſts in the exactly knowing the different Value of each Tree, and the different Kinds that each Land will bear.

Even in thoſe Soils and Situations whereon any Kinds of the common valuable Timber Trees will grow, there are ſtill ſome which will ſucceed better than others; and in order to make the greateſt Advantage from a Plantation, this ſhould be known. In the ſame Manner, even on the worſt there are generally two or three at leaſt that will ſucceed, let him therefore have all theſe in his Eye when he is about to begin a Plantation; and conſidering thoroughly their ſeveral Advantages, and the Circumſtances of the Ground, let him take Care to chuſe that which will be moſt ſure of Succeſs, and to bring the greateſt Profit. It is not ſufficient that he know how, by this Means, to turn his worſt Land to Account; but he ſhould know how to turn it to the greateſt that it will bear.

End of the FOURTH BOOK.



A COMPLEAT BODY OF HUSBANDRY.

BOOK V.

Of the Animals neceſſary and uſeful in Huſbandry and Farming.

In FOUR PARTS.

I. *Of* CATTLE.

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1. *Of the Horſe in general.*
2. *Of the Choice and Management of Horſes for the Farm.*
3. *Of the Saddle Horſe for the Huſbandman.*
4. *Of breeding of Horſes.*
5. *Of weaning Foals.*
6. *Of breaking Horſes for Service.*
7. *Of the Farmer's Number of Horſes, and their working.*
8. *Of the turning Horſes to Graſs, and taking them up.*
9. *Of the Aſs.*
10. *Of the Mule.*
11. *Of the Bull, and his Kind.*
12. *Of the Ox.*
13. *Of the Cow.*
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15. *Of Sheep, and their ſeveral Breeds in this Country.*
16. *Of the Choice of Sheep.*
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20. *Of Hogs, their Advantages and Evils.*
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25. *Of the wild Rabbit.*
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CHAP.

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43. *Of the making of Fiſh Ponds.*
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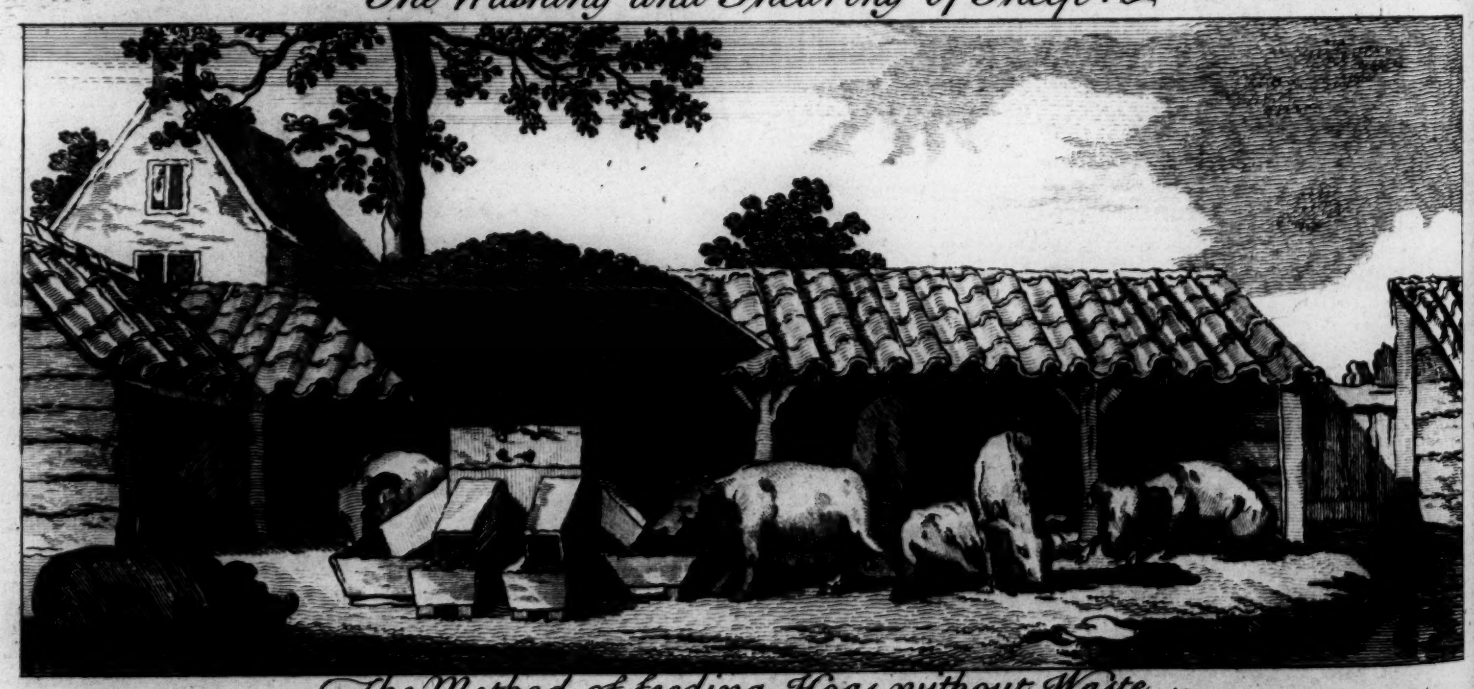
51. *Of taking the Honey and Wax.*

The Bull put to Labour. — The Pit for breeding of Mules.

The Washing and Shearing of Sheep.



The Method of feeding Hogs without Waste.

Elevation and Section of the Building for breeding of Rabbits.

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The INTRODUCTION.

Of ſtocking the Farm.

WE have in the four preceeding Books inform'd the Huſbandman concerning the Nature of his Soil, the Advantages of Incloſure, the Uſe of Manures, and the Benefit of Plantations; we are in this to advance to the great Article of ſtocking his Farm.

When he has made himſelf acquainted with the Nature of every Part of his Ground; when he has fenced, planted and prepared it for his Undertaking, it is then ready to receive his Cattle: part of which are to be fed upon its Produce, and part employ'd alſo in the Labours of tilling and improving it. Theſe are neceſſarily a great Expence, and they are expected to produce and yield him a proportionable Profit. This they are in their Nature qualified to do; but this Profit will be greater or leſſer, in Proportion to his Skill in ordering and managing of them according to their ſeveral Natures.

From ſome of theſe he is to have Labour; from others Food, and Articles of Trade; and from all of them properly managed, he may have many occaſional, and, as it were, accidental Profits. The Horſe is to ſave him the Toil of his Servants in many Things, the Ox and Sheep are to ſupply his Kitchen, and the Market; as alſo, the Hog, and other Kinds; but the home Conſumption is not all the Source of his Profits: many of their Parts and Products are exported at a great Price; and he will be able to make the more Advantage of his Stock, as he is the better inform'd of every one of theſe ſeveral Particulars; and adapts his Care to ſuch of them as his Circumſtances and Situation render the moſt immediately advantageous to him.

He is to conſider his Cattle with Reſpect to their Food, and its ſeveral Kinds, and with regard to that great Article, their Dung, the Uſes of which have been fully treated of already: this will lead him to enquire into their proper Management in the Field, in his Yard, and in the Stable. The ſeveral moſt beneficial Methods of regulating their Food, Litter, and Standing, will be a very principal Object of our Attention, under their ſeveral Heads in the ſucceeding Chapters. In which, proceeding upon that ſure and certain Guide, Experience, we have Hope of leading him to a much more beneficial Method of conducting himſelf in ſeveral Reſpects than is generally known at this Time.

In this Place it may be neceſſary to caution the Reader not to ſuppoſe us deficient with Reſpect to thoſe Articles; which, altho' they regard Cattle, are reſerved according to the Original Plan of our Work, to diſtinct and ſeparate Parts of it.

In this Place we are to conſider the Huſbandman as purchaſing his Stock, and diſpoſing and employing it on his Land; after which we are to proceed to the immediate Labours to be employ'd upon it. The ſeveral Products of his Stock in Hide, Tallow, and the other Articles are to be conſider'd hereafter in their proper Place; as alſo the Diſeaſes to which the ſeveral Kinds may be incident; for we do not ſuppoſe him to purchaſe one Kind labouring under Diſtempers; or to intend the immediate ſlaughtering of the others. Theſe Things therefore are to be treated of hereafter, and in the preſent Part of our Undertaking, we are to conſider the ſeveral Creatures themſelves; their Service, Breed, Management in every Reſpect; and the ſeveral Methods whereby they may be render'd moſt beneficial to him while he keeps them, and moſt advantageous in the Sale, when it is proper he ſhould diſpoſe of them.

We ſhall divide theſe Animals as they concern the Huſbandman under four general Heads, two larger and more important. 1. His Cattle and his Poultry; and two leſſer, but yet very worthy of his Conſideration. 3. Fiſh; and, 4. Inſects.

The two firſt of theſe every one is ſenſible, demand the moſt careful Attention, as on them depends a very conſiderable Part of the Farmers Expence, and his Profits; the two latter are not ſo much regarded as they deſerve, eſpecially the Article of Fiſh. We hope to be able to ſet that Article in ſo true a Light, that the Huſbandman ſhall for the future underſtand it as one of the regular Parts of his Occupation, and not the leaſt in Profit.

BOOK V. PART I.

Of CATTLE.

CHAP. I.

Of the Horſe in general.

WE are ſenſible Volumes might be written on the Horſe, for Volumes have been written on it already, and the Subject is not exhauſted: but the Buſineſs here will be to ſelect from all that has been ſaid, and may be ſaid on this copious Subject, that which is to the immediate Purpoſe of the Huſbandman.

We ſhall endeavour therefore to ſeparate the uſeful from the ſuperfluous and oſtentatious; and no more to omit any Part of the one, than load this Treatiſe with any of the other. It is not the Purpoſe here to conſider the Horſe as the Racer, or in the Manage, but as the uſeful Servant of the Huſbandman, who is to buy him for his Purpoſes, with Remembrance, that if he can

breed from him, ſell him at an Advantage, or any other Way make him produce a certain Profit, 'tis all within the Compaſs of his Profeſſion. We would no more have our Farmer a Jockey, than we would have him a Sportſman; but ſo much of every Branch that regards this Animal, as may be uſeful to himſelf, without tranſgreſſing the Bounds of his proper Profeſſion, we would have him know, and ſo much we ſhall endeavour to inform him.

The Diſeaſes to which this noble Animal is ſubject are very numerous, and very little underſtood. Theſe deſtroy many a uſeful Creature that might be preſerv'd with a little proper Care; and it is not too much to ſay, that after all that has been written on this Matter; after the innumerable Bundles of Receipts in old Authors, and the Diſcoveries, great as they are, which have of later Time been made by ingenious Foreigners, as well as by our Gibson, Bracken, Bartlet, and the reſt, there is no Book in the English Language ſo much wanted, as a compleat Syſtem of Farriery.

It is not within the Compaſs of our Undertaking to enter upon ſuch an Article at large, nor is any more than a ſmall Part of what might be ſaid on that Head neceſſary to the Farmer; but that Part we ſhall endeavour to lay down in its Place, by the Aſſiſtance of many Enquiries, and a long Experience, if not in a compleat and accurate, at leaſt in a uſeful Mannner.

It is but of late that the Conſideration of Horſes has fallen into the Hands of thoſe who had any of the Requiſites for being capable of a due Care of them. Farriers have been uſed to be of the moſt ignorant among Mankind; and every Blackſmith called himſelf at one Time a Horſe Doctor. Of late the great Uſe of this noble Creature in our various Concerns of Buſineſs and Pleaſure, has reſcued it out of ſuch Hands, and made it a ſubject for more Education and Abilities; and though the Practice be yet far ſhort of Perfection, great Advances have been made in it, with which the Huſbandman ſhould not be unacquainted.

So ignorant have the old Writers on theſe Subjects been, that they are continually miſtaking the very Seat and Place of the Diſeaſes in this Animal; and at this Time nothing is ſo common, as to ſee thoſe who know no more of the Creature than what they read in thoſe erroneous Books, rowelling and burning a Horſe in one Place for a Diſorder, the Seat of which lies in another; and in one which cannot be affected in any Manner by what is done.

This may ſtand as a general Inſtance of that Ignorance which reigns too univerſally with reſpect to Horſes: excepting for the Cheats of Jockeyſhip, People are as unſkilfull in every other Reſpect; for all that ſeems to be ſtudied now about a Horſe is, how to cheat the Purchaſer.

What reſpects the Diſeaſes of this Creature, will be explain'd hereafter under its proper Head; and here we ſhall endeavour to ſet the Huſbandman right with reſpect to the Nature and Kind of his Cattle, and his Management of them in Food, and at Labour.

Horſes, though all of one Species, may be divided into many Kinds according to the different Services for which they are deſign'd. Thoſe for the nobler Exerciſes, or the Uſes of Pleaſure, demand a great deal of Care and Trouble, as well as a large Expence; but the Farmer's Horſes, which are for Labour only, require comparatively very little of either.

Let him not take his Directions concerning them therefore from Books, where the principal Regard is ſhewn to the Racer, the Hunter, or the manag'd Horſe, for theſe do not belong to him: the plain and cheap Practice uſed for the Cart Horſe, and the poorer Sort of Road Nags, is all that concerns him: this he will find here laid down from repeated Trials, and let him compare it with the Management of his Neighbours, in order to ſee how it agrees with that, and how it excels it; for we would have him learn not only from what he reads, but what he ſees; and improve his Knowledge from the Miſcarriages as well as the Succeſs of others.

CHAP. II.

Of the Choice and Management of Horſes for the Farm.

IT is a Thing of great Concern to the Huſbandman to proportion the Number and Kind of Horſes to his Farm, and he is alſo to conſider the Sex. For in ſome Caſes breeding from them may be a Thing of great Advantage, and under other Circumſtances, it will not be prudent in him to think of it.

I have obſerv'd already that a certain Proportion ſhould be kept up as near as may be between the Arable and Paſture Land of a Farm; but this cannot in the Nature of Things be always done ſo exactly in Practice as might be wiſh'd from Theory. Now the Exceſs in either Kind, where it cannot be avoided, will give the Huſbandman a proper Caution as to the Sex of this Cattle, as the Nature of the Employment for which he wants them will for the Kind.

The Horſe for Plow muſt be ſtrong, no matter for his Shape. But for Cart ſome Care ſhould be uſed in the Choice, and in the Size. Theſe ſhould be big breaſted, large bodied, and ſtrong limb'd; and they ſhould always be bought of a moderate Size, not only that they may match with one another; but that others may eaſily be got to match with them when any die, become uſeleſs, or are ſold out.

The having Horſes for ſlow Draught all of a Size, or nearly ſo, is a very conſiderable Article; for otherwiſe the Team never work equally, nor at Eaſe to themſelves; and the Huſbandman has not the Advantage of half their Strength, though they go through an equal Fatigue: the tall Horſes hanging up the low, and it being altogether impoſſible that they ſhould draw evenly together.

It is a Benefit in the Horſe intended for this Service to be ſluggiſh: the fitteſt for it are ſuch as require the Whip, rather than ſuch as are ready to draw more than needful.

On

One thing more I ſhall obſerve to the Farmer, which is, that he avoid that very common Fault, the making one Horſe ſerve for different Uſes. Nothing is ſo wrong. Let him never put a Saddle upon his Cart or Draught Horſes, for it alters them in their Pace, and renders them aukward and troubleſome in their ordinary and proper Labours.

After the Kind, let the Huſbandman conſult the proper Sex of theſe Cattle, and in this, as I have obſerved, he is to be directed by the Nature of his Farm, and the Proportion of one Kind in his Land to another.

Mares are naturally more profitable than Horſes, becauſe, beſide their Labour and Service, they yearly will bring forth a Colt. But let not the young Farmer reſolve at once, for this Reaſon upon the buying that Sex, he muſt look farther. If he have a great deal of Paſture Ground, in proportion to his Arable, then he will do right to ſtock himſelf with Mares; but on the contrary, where the Arable Land is the greateſt Quantity, and the Paſture but little, he will find it much more to his Advantage to have Stone Horſes or Geldings.

We ſee that in ſome Counties the Farmers in general purchaſe Mares, and in others they in general keep Horſes for their Service; and this, at firſt Sight, may ſeem idle; but it is founded on this Rule, and on what they find anſwer beſt upon Experience, becauſe their Lands are ſo diſpoſed. In ſome Counties the Arable is in general over-proportioned to the Paſture Ground; and theſe are the Places where they keep Horſes moſtly; and in others the Paſture Ground in general over-ballances the Arable, and theſe are the Places where the Run is upon Mares.

When the Nature of the Farm thus recommends it to the Huſbandman, to purchaſe Mares rather than Horſes, he is to remember that it is of more Importance to him to conſider their Shape: becauſe on that will, in ſome Meaſure, depend the Value of the Breed.

Let him chuſe his Mares with a good Forehand: the Neck, Breaſt, and Shoulders are, in this Reſpect, to be his principal Regard; for as to the reſt of the Shape it is not of ſo much Conſequence.

But though he don't much regard the Shape, let the Body be large; for it is a great Advantage to the Foal to have Room, while it is growing in the Mare's Belly.

The Foals that the Huſbandman ſhall have from Mares thus choſen, will pay him very well for his Care: they will generally be well-ſhaped; and it may be worth his while to ſell them at about ſix Years old, when they will uſually bring a fair Price.

Nor let him think that the keeping them to this Age before he diſpoſes of them, is any Hardſhip; for their Work, the greateſt Part of the Time, will very well pay for it.

This is ſo certain, that where the Huſbandman has not the Advantage of breeding, from a Deficiency of Paſture Ground, it is worth his while to buy Colts young, and train them up to that Age for Sale. This is practiſed in many of thoſe Counties where the Arable in general exceeds the Paſture; and it is very well known in particular, that the Huſbandmen of Hertfordshire buy Foals out of Leicestershie, which is a good breeding County, to ſell again at an Advantage. They buy them at two or three Years old, and ſell them again at ſix. The Foals improve every Year; their Labour anſwers very well for their keeping, and at the End of this Time they are fit for Coach Horſes, and are commonly ſold in London for that Purpoſe.

In ſome Counties an ordinary Sort of Horſes are much required for Carriage of Loads, as Packs, Panniers, and the like. When the Huſbandman wants a Creature for this Uſe, let him obſerve to chuſe him of a ſtout Make, but not tall. Let him have a broad Back, out Ribs, full Shoulders, and thick Withers. This is a very material Circumſtance, for an Horſe that is thin in that Part is always galling: which is a very great Inconvenience to Horſes that are to carry Burthens.

After his Shape, let the Purchaſer obſerve his going, and examine carefully his Pace. That Horſe is beſt for this Service that takes the ſtouteſt and beſt Stride with his Feet. He is neither to trot nor gallop: all his Buſineſs is a Foot-Pace; and for this Purpoſe the Horſe that takes the largeſt Steps, always goes eveneſt and eaſieſt, and rids Ground the faſteſt.

The Horſes being purchaſed for the Farm, according to the ſeveral neceſſary Labours of the Plow, the Cart, or Carriage, the next Thing to be conſider'd is, their Management; and this is very eaſy. Theſe Creatures which are deſtin'd to coarſe Service, require nothing of thoſe pamper'd Methods which are needful to the fine Horſes, that are rendered delicate by Idleneſs. They require nothing of thoſe Walkings and great Care, and nice Dreſſings, but what they do require let the Farmer ſee they have duly and regularly.

Let them be well dreſs'd, and their Bellies well fill'd: for otherwiſe they will never be able to go through their Taſks of Drudgery. Let their Shoes and their Backs be conſtantly looked to; and little or nothing more is neceſſary.

Let their Food be ſweet Hay, or of other common Kinds ſingle, or mix'd together, according to the Owner's Convenience; once in a Week or ten Days let him always give them ſome warm Grains and Salt: this will keep them in Health: for they will eſcape moſt of the common Diſorders of Horſes, by their conſtant Exerciſe and Labour, with this little needful Care.

For what may be farther needful, according to the particular Circumſtances and Condition of the Horſe, I ſhall in a few Words obſerve. That if bleeding appear requiſite, Spring or Fall is the Time, or both. If there be Danger of any Diſorder about his Head, it is good now and then to burn a little Frankincenſe under his Noſe, when he is about to lie down at Night. In the Heat of Summer it is very good to take a labouring Horſe into deep Water, and ſwim him now and then.

It will do no Horſe any Harm to be bled every Spring and Fall; but if once this be made into a Cuſtom, let it be regularly obſerved: for ſo ſure as it is omitted he will have ſome Diſorder. Nature expects theſe artificial Diſcharges, if they have been brought into a Cuſtom, as regularly

as if they were her own, and can no more do without them.

A fat Horſe ſhould drink often, and but a little at a Time; but if an Horſe be lean let him drink as he pleaſes.

A great deal of rubbing does a great deal of good: every Horſe likes it, and every Horſe is greatly benefited by it. A Horſe ſhould always be turn'd to Graſs once a Year; for it cools his Blood, ſcours off all foul Humours, and prepares his Stomach to receive the full Nouriſhment from his other Food. Nothing tends ſo greatly to the preſerving the Huſbandman's Cattle as this; nor is there any thing ſo prejudicial to them as the Omiſſion.

CHAP. III.

Of the Saddle Horſe for the Huſbandman.

I HAVE cautioned my Farmer, in the preceding Chapter, not to put a Saddle on the Back of his labouring Horſes; therefore, as his Occaſions will neceſſarily take him frequently on Horſeback, he muſt keep one or more particularly for that Purpoſe; and I ſhall not leave him him defective as to the Kind and Management of that Creature.

Neither need the Horſe, though bought for this Uſe, be ſtrictly kept to that only: he may be ſerviceable on many Occaſions: the Draught, or Load Horſe, muſt not be taken from his Work, becauſe it ſpoils his Pace, but there are many little Services for which the Saddle Horſe will do, when he is not requir'd for that Uſe; and it will do him no Sort of Harm to take him to them as Neceſſity requires.

In the Choice of an Horſe for the Saddle, let the Huſbandman obſerve to get one of as good a Shape as his Price will afford; for it is a general and a very good Rule, that the Value of a Horſe for the Road may be judg'd of by his Truth of Form.

Let him ſee that his Head be lean, his Eyes prominent, or full; and his Neck well rais'd. Let his Chine be alſo well riſen, his Joints ſtrong, and his Raſterns ſhort and ſtrait, and ſo ſtrong as not to bend in his going: and let his Hoofs be ſound, tough, and hollow.

Laſt of all let him examine his Temper and Diſpoſition. In this he ſhould be moderate: too dull a Jade is as bad as a run-away. The Huſbandman wants his Nag for Service, and let him chuſe him ſuch as will do his Buſineſs freely, without continual whipping and ſpurring; and yet will not be eager to go on when there is no Occaſion.

This Care having been taken in the buying of the Horſe, the next Concern is the feeding of him. His general Food ſhould be fine Hay in Winter, and ſweet Graſs in Summer; and to theſe are to be added dry Oats, Beans, Peaſe, or Bread, according to his Stomach or Occaſions.

When he is upon Exerciſe let him be watered two Hours before he is taken out to ride, and let him be rub'd, dreſs'd, and fed; and after this let him be bridled up, and ſtand an Hour before he is mounted.

At ſetting out on a Journey, obſerve always that the reaſonable Method is to travel moderately in a Morning, till the Horſe be warmed, and then to encreaſe the Speed as Occaſion requires.

At Night the Horſe ſhould be watered two Miles before he comes to his Journey's End; and then let him be brought in warm: and let him be ſet up in a warm Stable, well rub'd and well littered.

Let him have no Meat while he is in a Sweat in any Part, but when he is dry let him be rub'd and fed, according to his Stomach and his Duty.

If at any Time the Road Horſe wants Appetite, let the Rider obſerve to change his Food, for theſe Creatures love Variety as well as ourſelves; and will often be tempted to eat new Meat when they would not have touch'd the old. If this do not anſwer, let there be a ſmall Quantity of white Wine, Salt, and Vinegar mix'd together, and let his Tongue and Noſtrils be rub'd with it. This ſeldoms fails to recover his Appetite.

After this let the Rider look well to his Back and to his Feet. Let him ſee that the Saddle does not gall, nor the Girts pinch him; and that the Shoes be large enough, and that they ſit faſt and eaſy.

Theſe are the Directions neceſſary for the managing and preſerving a Road Horſe, in Condition to do his Buſineſs. I have ſet them down at large, that the Huſbandman may fully underſtand what he is to do. The leſs the Buſineſs in long Journies, the leſs of this ſtrict Care is neceſſary: but let it be proportioned to the Duty. 'Tis always well to know the whole that may be neceſſary; and too much Care never did a Horſe Harm.

CHAP. IV.

Of the breeding of Horſes.

WE have ſhewn what is the Huſbandman's beſt Practice in Counties where it is uſually neceſſary to buy Horſes, whether in the Colt or at other Ages; but when he is ſituated in a good breeding Country, there is nothing whatſoever which he can practiſe to more Advantage, than the doing this, both for his own Service and for Sale.

We ſhall therefore lay down here ſuch Rules as may be neceſſary to be obſerved in this Matter, and although the immediate Purpoſe be no other than the breeding of Horſes for the Service of Huſbandry, and the coarſer Employments; yet, as the Farmer may ſometimes ſtep a little beyond theſe ſtrict Bounds to his Advantage, we ſhall not ſo exactly confine our Inſtructions to them, as to diſcard totally the reſt.

The firſt Conſideration that is to fall under the Huſbandman's Thoughts who is inclined to breed, is that of his Ground, for though he live in a good breeding Country, yet every Part of it may not be ſuited alike to that Uſe, and his own Lands in particular may not be convenient for that Purpoſe.

The Ground that is proper for the breeding of

Horſes, is to be of a middle Value between the beſt and the worſt. Horſes are a very valuable Commodity, but let not their Price at a proper Age, and of a good Kind, tempt the Huſbandman to enter raſhly upon his Deſign. Horſes are ſubject to many Accidents and Caſualties; and at beſt they are a long while in riſing to their Value: therefore let him firſt conſider whether he cannot make greater Advantage of his Ground in the common Way of his Employment, for it is very likely that he may. If it appear that he can, then his Land is too good; and he ſhould for that Reaſon drop his Deſign: on the contrary, he may be poſſeſſed of Grounds which as they will not produce much any other Way, ſo they may not be rich enough for this. In that Caſe he is alſo to drop it. In the one Inſtance it is not worth his while; and in the other he cannot accompliſh it: both theſe are very ſufficient Reaſons for deſiſting.

It has been obſerv'd already, that the Condition of the Huſbandman's Grounds which ſhould tempt him to have Mares for the Sake of their Breed, is where the Paſture Land bears an over-proportion to the Arable: but we ſee by the laſt Obſervation, that a certain Condition in this Paſture Ground is alſo requiſite. If it be very rich, it will yield more Profit other Ways than by breeding Horſes; if it be very poor, on the contrary, it will not yield ſufficient Nouriſhment; and therefore it is incapable of being put to this Uſe. The proper Paſture Soil for breeding theſe Creatures, is therefore of a middle Nature.

It ſhould be ſuch as yields a ſhort Graſs, but in a good Quantity: as for Situation, it ſhould be high much rather than low; and the Soil muſt be ſuch as has ſome Firmneſs, for its being hard under Foot is an Article of great Advantage. We would not be underſtood to mean, that an exact Attention to ſuch a Soil as this is neceſſary, or that no other will do, but this is beſt.

There muſt be good Water upon the Ground; and if it be full of Mole Hills, and other uneven Places, it will be the better, becauſe it will uſe the Colts while young to tread firm; and this is an excellent Article in their breeding.

A good Air is a very great Article alſo in a breeding Ground; but as we have already recommended its lying on an elevated Situation, this will be the more likely the Caſe; and further it will be needful that there be good Shelter.

Incloſed Lands of this Kind and Condition are the beſt for breeding, becauſe they are warm and defended; but open and common Land may be uſed; only in this Caſe the Huſbandman muſt be the more careful to provide convenient Shelter; and muſt be more than ordinary careful of the Mares juſt about the Time of their foaling, and of the young when it is yet tender.

When the Huſbandman has a conſiderable Quantity of Land that he deſigns for this Purpoſe, it ſhould be divided into ſeveral Paſtures, according to the Condition and Circumſtances of the ſeveral Parts of the Ground; and theſe ſeveral Incloſures ſhould be uſed to theſe Purpoſes following.

The barreneſt and pooreſt are for the Stallion to run in with the Mares: the moſt under Shelter, and the leaſt ſubject to Accidents, are to be kept for the Mares to foal in: then the fruitfulleſt and richeſt are to be kept for them while they are follow'd by their Foals, and give Milk. Laſtly, for the bringing up of the Colts after they are wean'd, the largeſt, openeſt, and the moſt uneven.

According to the Uſe for which the Colts are deſign'd, let the Stallion and the Mare be choſen. We have already directed what Choice ſhould be made of Mares for the Service of Huſbandry, which is our material Purpoſe: for any other Uſe they are to be ſelected in the ſame Manner, but with regard to that particular Service.

As to the Stallion, he is to be choſen according to the particular Service. The Turkiſh, or Jennet, is an excellent Kind for a Horſe intended for the Wars: the Barb is the beſt for Racers; the beſt for hunting is the baſtard Barb begot of the Engliſh; the beſt for the Coach is the Flemiſh; and the beſt for Travel, Draught, or Burthen, is the Engliſh.

Theſe are Rules long ago laid down, and ſince that Time often diſputed; but they are nevertheleſs maintain'd with Reaſon by the moſt experienced to this Day. Fancy and Opinion ſo far prevail at this Time, that it is ſcarce poſſible to find two People who will not diſpute upon this Subject. However, he who obſerves theſe Rules will not repent: and, as to the material Part of our Buſineſs in this Place, that is the begetting of ſerviceable Horſes for the Huſbandman, the right Engliſh is the Stallion for that Purpoſe, beyond all Cavil or Diſpute whatſoever.

The beſt Seaſon of the Year for putting the Stallions and Mares together is about the middle of March, and the Stallions ſhould be taken away again about the Beginning of May. The Reaſon of this is, that the Time of foaling is of great Conſequence: for the Foal that falls in March is much more profitable than that which falls in May, it having the Advantage of a Part of the Cold of that Seaſon, and the whole enſuing Winter to harden it. Experience ſhews, that this is of great Conſequence: for the Colts foal'd in March are always found to ſtand better, and be leſs liable to Accidents and Injuries than thoſe which fall later in the Year.

The Farmer muſt take Care to have his Paſtures in proper Order for the receiving his Horſes and Mares at the Time mention'd, and for the other Purpoſes ſpecified before; but he will do well to obſerve this Rule, not to make his Mares too fat before the Time of their running with the Stallions; for they conceive better, and hold better when they are in but ordinary Caſe.

It is proper to give the Mares three Weeks Reſt from Labour after the Time of their conceiving; after this they may be employ'd in the common Affairs of Huſbandry, but it is beſt not to work them too hard: the Farmer may, without any Damage, keep them thus to work till

till the next Spring; and then he ſhould let them run looſe till they foal.

I deliver this as the beſt Method of conducting Mares that are Breeders, but I do not ſay every Part of it is abſolutely neceſſary to be obſerved. If the Neceſſity of the Farmer's Affairs require it, he may have more Work out of them than I have allowed; but if he allow them ſo much Reſt, they will do the better, and he will have the Advantage in the Foals.

When the Mare has foaled, ſhe ſhould be immediately removed into the beſt Paſture the Farmer has, for this will make her have Plenty of Milk, and that of a good and nouriſhing Quality. The Foal will ſhew the Benefit of this, for he will thrive apace. The Paſture muſt not only be rich, but ſuch as has ſweet Water and good Shelter, eſpecially if the Foal have fallen early: and it will be adviſeable to let the Mare take Care of it a good Part of the Summer: if Convenience allow, it will be uſeful to the Foal to leave him with his Parent the whole Summer, and even the following Winter. There is a Notion that the Winter's Milk is not wholeſome, but it is a weak and idle Fancy. The Farmer is to ſuit all this Practice to his other Affairs, but of this he may be ſure, that if he can allow of it, the Foal will be the ſtronger and better in every Reſpect for running the whole Year with his Dam.

The Foal will partake of the Nature and Qualities of both his Parents, but moſt of the Mare; this is an Obſervation as old as Virgil; but the Horſe is of great Conſequence alſo.

Both the Stallion and Mare ſhould be ſound, if healthy Colts are expected, for they will partake of the Diſeaſes of their Parents in both Sexes.

The Way to have large Colts, is, 1. To chuſe, as before directed, large body'd Mares; and, 2. To feed them well during the Time of their Pregnancy; for the two Things that give Size to the Foal are, good Nouriſhment and Room to grow in. Very large Foals have been thus produced from ſmall Stallions; and of this frequent Experience leaves no Room to doubt.

A great deal of Care ought to be taken to keep the Mares tame, and alſo to make the Colts at firſt tame in the ſame Manner; for otherwiſe the Mares often injure them while in their Bellies, by leaping Hedges and Ditches, and the Foals in the ſame Manner damage themſelves while they are young by their unruly Frolicks. A very good Way of keeping the Mares tame and gentle, is by giving them daily ſome Work, for this accuſtoms them to be tended and handled: whereas when they run free the greateſt Part of their Time, as is the Caſe very frequently among thoſe who can ſpare their Labour, they are difficult to be kept in Order; to be removed from one Paſture to another, as Occaſion requires, or to have the Foals properly tended.

A great deal of Nicety is uſed in the breeding Horſes for the finer Employments, but 'tis the Huſbandman I am directing, and he may in the Manner I have ſhewn, avoid the Trouble and Expence of houſing his Mares, and all that Ceremony commonly practiſed; and he will often have better Foals than thoſe who obſerve the moſt exact Rules; as we ſee frequently, nay commonly, the Children of ordinary People more healthy and ſtrong than thoſe of Quality, who are brought into the World with a great deal more Pomp and Ceremony.

The Age of a Mare for breeding in the beſt and moſt advantageous Manner, is from four to twelve Years old, if ſhe have been employ'd in the common Labour of Huſbandry during the Time; but if ſhe have been kept for breeding entirely, ſhe may be held to it a great many Years longer.

The Age of the Horſe ſhould be from five Years to fifteen.

When Mares are kept altogether for breeding, it may be proper to beſtow ſome more Care and Expence upon them than uſually is done when they breed and work together; and it is the Owner's Buſineſs then to keep them as cloſely to it as may be. In this Caſe it is a good Method to feed them richly for a Fortnight before their foaling, which will give them Strength, and Plenty of Milk: it will make them ready alſo the quicker to take Horſe again.

Where a Mare is thus manag'd, ſhe may be led to the Stallion three Weeks after her foaling; and her Foal may run by her till ſhe comes again.

CHAP. V.

Of weaning Foals.

Notwithſtanding that the common Practice is to wean a Foal at about ſix Months, when that falls out toward Michaelmas, or elſe about ſix Weeks before the Dam foals again, provided that happen in a good Seaſon, we have adviſed the Farmer to let his Colt run by the Dam till ſhe gets another: and in this we are ſupported by very profitable Experience: for upon the Reſult of many Trials it appears in general, that the Colt which has run the Winter with his Dam, is ſtouter and more healthy than ſuch a one as has been wean'd at the Approach of Winter, whatever have been the Care taken of him.

The weaning of a Foal at whatever Age, or particular Time it be done, is an Article of great Conſequence; and upon the proper conducting of it depends in a great Degree the future Value of the Creature. If Care be not taken in the Article of weaning, and in the ſummering and wintering the Colt for three Years afterwards, he will never be worth nearly what he might under this right Management.

The Colt that is to be wean'd ſhould be taken from its Dam over Night, and driven into ſome warm and ſhelter'd Place out of her hearing: it muſt be fed carefully, and well in the Morning; and from that Time thoroughly attended for four or five Days: in that Space it will have forgot the Dam, and may be turn'd out to take its Chance: but Care muſt be taken to keep it out of hearing of the Dam for that whole

whole Summer, after which there will be no need of any particular Caution.

Such Colts as are intended for Geldings, are to be gelt at the Time of their weaning, and then the ſame Care ſerves, and as ſoon as thoſe few Days already directed are over, the Part will be healed; and will occaſion no farther Trouble.

After this the Colts ſhould be ſeparated from the Filleys, and each Parcel turn'd out apart into ſome open Paſture where they may have Room, and a free good Air; and may run at Liberty till they are fit to be broke for the Saddle, or for the Service of Huſbandry.

Some practiſe the Gelding of their Colts much younger than we have here directed, and when that can be done with Convenience, it is altogether as well. They do it while they ſuck, and as ſoon as the Teſticles come down: ſometimes gelding them at a Fortnight old or leſs.

When it is done at this Time, there ſeldom are any bad Accidents attend it: but on the other hand, all the Damage that appears is a little ſwelling of the Parts after cutting; and this goes down when they have been kept carefully three or four Days, which is what we have adviſed to be done on Account of their weaning.

Theſe two Methods are ſo little different in themſelves, that the Huſbandman may follow which he likes beſt; but if he come to a Reſolution in Time, that while the Colt is very young, and is ſucking, is rather preferable.

For whatſoever Service the Huſbandman intends his Breed, whether for Sale, or for the Uſes of his Farm; and whether he raiſe fewer or more, it will be of great Importance to him to obſerve the Directions laid down in theſe Chapters, relating to their breeding and weaning: that he may not be ſtartled at the Trouble, we have made it as little as poſſible; cutting off all that Experience has ſhewn to be ſuperfluous in the common Practice; but the little that is here ſet down, he is to obſerve carefully: for he will find his Colts the ſtronger and the handſomer for it; and the fitter for his own Service, or for fetching him a good Price at the Market.

CHAP. VI.

Of the breaking Horſes for Service.

IT is ſeen in many Things that the greateſt Advantages depend upon what appear to be ſmall Matters, and is thus in the Caſe before us. I have given the Huſbandman his Directions for breeding his Colts; but he is yet to take the Care of breaking them; and although this is a Point ſufficiently regarded in Horſes of the finer Kinds, yet no Article of Huſbandry is ſo ſhamefully neglected, as the proper Care of firſt training the Horſe to his ſeveral Services in that Employment.

One common Fault on this Head is, the neglecting to break them at a proper Age. The ſparing a little Trouble at a right Time, is the ſpoiling of many a good Horſe.

The Colt that is expected to turn out ſerviceable ſhould be broken early, and uſed gently at firſt. The common Cuſtom is to ſpoil a Saddle Horſe, by making him do too much as ſoon as he is broke, and the uſual Deſtruction of the Draught Horſe for meaner Service is the not breaking him in time.

To avoid theſe common Errors, let the careful Huſbandman take the following Directions. A Year after the Colt has been turn'd looſe from his weaning according to our Method; that is, when he is about two Years old, let him be taken up and gently and gradually tamed. Let him be uſed to the Hand for another Year; and at the Expiration of that, this is when the Colt is three Years old, if he be for the Saddle let him be back'd; or if he be for Draught or Burthen let him be broke to it. But whichever be the Caſe, let it be done gently and gradually. Let a very little be requir'd for the firſt Year; and ſomething more the ſecond, but in Moderation; that he may be regularly brought to his full Strength and Service.

The Saddle Colt ſhould be little more than walk'd the firſt Year; and ſeldom carried beyond a Trot the ſecond; after this there will be no Danger of ſpoiling him, except by unreaſonable Uſage. In the ſame Manner let the Colt be taken up at that Age for Labour in Huſbandry: but the firſt Year let him draw but little; and the ſecond advance his Labour but moderately: thus he will by Degrees be train'd to know his Strength, and how he is to uſe it.

Gentle Exerciſe an Hour a Day is enough the firſt Year; and two or three Hours a Day the ſecond. The Creature does not come to his Strength till ſix or ſeven Years old; and he never thoroughly comes to it at all, if he be too hard wrought while he is younger.

There is no Time nor Service really loſt this Way in the Horſes the Farmer breeds for his own Uſe; becauſe they will ſtand ſerviceable many a Year the longer for this Care and Tenderneſs of them at firſt; ſo that he gets doubly at the End what he loſes by his Gentleneſs in the Beginning; and all the Time of their Service the Cattle are ſtouter, and do ſo much more.

A Horſes ſtanding ſound the Remainder of his Life, is greatly owing to the Treatment of him in the Beginning; and who would ſcruple to forfeit a little of this Creature's Service the firſt two or three Years, to keep him ſound and uſeful all his Life. How long a Horſe will continue ſerviceable is a Point not yet determin'd; nor indeed ever can fairly, except a due Care were taken of them at firſt; but as to their Length of Life, it is more than People imagine. Dr. PLOT, Chap. vii. Page 37. of his Hiſtory of OXFORDSHIRE, mentions no leſs than three Horſes that he had ſeen in that County of about forty Years old a Piece; and the late Duke of MONTAGUE had one which was confidently reported to be not much leſs than fifty. It had been kept without Labour ſeveral Years; but did not ſeem to have been a great many Years paſt Service of one Kind or other.

When the Colt is firſt taken up, he will often be ſullen and unruly: and it is a Neglect at this Age that makes the Horſe vicious all his Life.

In

In this Caſe they muſt be brought to Gentleneſs by Hunger, which will tame any thing. Let the Huſbandman who has ſuch a Colt, ſuffer him to have no Victuals but what he takes out of his Hand.

If this do not bring him down, let him be kept waking Night after Night; for the moſt unruly Horſe in the World, while young, will be broke and rendered tractable in this Manner.

It is a good Method to uſe the Colt to Gentleneſs while he follows the Dam, by giving him good Food from the Hand, and the like Methods; for this will take off that natural Shyneſs and Fierceneſs which there is in every Horſe, till made gentle by Uſe.

Another great Time of a Colt's growing unruly is, when he is firſt back'd, or firſt brought to draw. In either of theſe Caſes the making him go in Company of other Horſes is a very great Thing. When he is firſt rode let it be very gently, with another Horſe before him, and the more about him the better; and in the ſame Manner, when the Huſbandman firſt puts him to work in his Way, let him not be ſet to draw alone, but with others, and let his Taſk be very eaſy and of ſhort Continuance.

It was not without Difficulty that Horſes were originally broke for the Service of Mankind; and ſome Care is yet requiſite to every one of them, at its breaking. The Colt that would fly out, and perhaps do himſelf or thoſe that worked him a Miſchief, if he were employed alone, or ſet to an heavy Taſk at firſt; when the Buſineſs is eaſy, and he ſees others of his own Kind about him, ſoon ſubmits; and then he is eaſily led from the lighter to the harder, and finally to the hardeſt Duties.

CHAP. VII.

Of the Number and working of Horſes.

I HAVE obſerved already that the Huſbandman is to ſuit the Sex of his Draught Cattle, to the Nature of his Ground, that he may have the moſt full Advantage from them: he ſhould alſo, in the ſame Manner, conſider their Kind and Size, for that Sort of Horſes may ſuit with one Farm, which will not do well upon another.

The general Conſideration on this Head is, the Richneſs of the Paſturage, and the Size of the Cattle, for theſe are to be proportioned to one another. The Huſbandman who has rich Ground ſhould breed large Horſes, for they will every way be moſt advantageous to him; and on the contrary, he whoſe Land is poor muſt content himſelf with a ſmaller Sort, except Stone Horſes, if he ſhould chuſe to keep them always at Hay and Oats: in that Caſe he may take what Kind he pleaſes; but this is a Practice not at all to be recommended to the Huſbandman in general.

Horſes muſt be well fed, if they are expected to go through a great deal of Work; and large Horſes will never be ſo upon poor Paſtures. This is a fundamental Rule for the Farmer; and he muſt always keep it in his Memory. It is not eaſy to ſay what Number of Horſes will anſwer the Huſbandman's Purpoſe, for any certain Quantity of Ground. This has been attempted, but the Differences between one Kind of Land and another, in the Degree of Labour they require, makes it impoſſible to determine with Certainty. Upon a general View perhaps it may be reaſonable to ſay, that in Land of a middle Sort, about one Horſe to every ten Acres will anſwer the careful and ſkilful Huſbandman's Purpoſe. He that wants Knowledge and Management, may uſe twice as many, without doing half his Buſineſs.

When the Number of Horſes for the ſtocking of the Farm has been ſettled as well as it may be, the next Care is the proportioning the Work among them: and on this depends a great deal of the Profit that is to be made by this Sort of Cattle.

The young ones we have ſaid, are to be work'd but gently. They may be continually kept doing ſomething at the Harveſt, Seed Time and Fallowing, but they are never to do any thing hard. There are ſufficient Articles of Drudgery in the Farmer's Buſineſs, and theſe he is to throw upon ſuch Horſes as will never be worth any thing by Sale. He is to keep a proper Number of theſe for hard Work, and though they be aged or blind they will anſwer his Ends, provided they are well fed. The ſlight Work of the others, in the mean Time, only accuſtoms them to their Geers, and makes them bring the better Profit upon the Sale.

The Huſbandman who falls into the Method of buying up young Colts, from the breeding Counties, in order to ſell them again at five Years old, muſt take a great deal of Care in the Choice he makes of them: for ſuch as they are, ſuch they will grow up: and the Farmer who breeds muſt, in the ſame Manner, be careful of his Stallions and Mares, according to the Rules given before, otherwiſe he may be greatly diſappointed, when he comes to the Fair with them for Sale. With due Caution there is hardly a more profitable Article in his Buſineſs, for there are always Purchaſers for them, and the Price, if they be well choſen, is very conſiderable: but I have often known the Huſbandman, when he has taken a good Number of them to the Fair, forc'd to ſell them for little, or to keep them on his Hands, either from his ill Choice of the Mares out of which he bred them; or from his little Skill, or little Care, in buying them when Colts.

Blindneſs and other Accidents will happen to Horſes ever ſo carefully bought, or ever ſo carefully bred; but theſe muſt be borne with, all Dealings admit of ſome Accidents: we do not pretend to call that of Horſes one that is more exempt from them than the reſt; on the contrary, it is perhaps as precarious as any; but the more uncertain of Succeſs it is, the more ought the Cauſes of that Uncertainty to be watch'd; and the more needful is a ſtrict Obſervance of thoſe Rules which may prevent the Loſſes that often attend upon it.

As the Horſe is the firſt and moſt conſiderable of all the Animals that are of Service to Mankind, the ſtrongeſt, ſwifteſt, and moſt generally uſeful; it is a Creature that will naturally be of certain and ready Sale: the Variety of

Uſes in which the Horſe is employ'd, will make a Demand for all Kinds, and thoſe of all Qualities. 'Tis therefore an Article of ſo much Profit, and ſo naturally and commodiouſly in the Way of the Huſbandman's Employment, that he ſhould never be deter'd from meddling in it, by Accidents or poſſible Loſſes. This we may, with the greateſt Truth, aſſure him, that his Profits in general will be certain, including all Things, and that the Degree of them will be always proportioned to thoſe two Articles, his Skill and his Care.

By Skill we do not mean that of a Jockey or profeſſed Dealer, for that is rather Artifice and Cunning, and may be called the Art of cheating the Buyer. It is unworthy of an honeſt Man; and it would take off the Farmer from his more uſeful Studies. We mean by Skill nothing more than a Knowledge of thoſe plain and general Facts, laid down here in few Words; and by Care nothing more than his keeping that Knowledge always in his Mind; and acting according to it on all Occaſions.

CHAP. VIII.

Of the turning Horſes to Graſs, and taking them up to the Stable.

TO the Rules already laid down for the general Management of Horſes, I ſhall add ſome particular Cautions and Methods for the conducting that important Point, the giving them freſh and green Meat, and after that, cloſe what is here to be ſaid of this uſeful Animal.

The proper Time for the giving the Huſbandman's Horſe green Food, is in the Beginning of MAY, and the Time for taking him up is toward the End of AUGUST. There are ſeveral Ways of doing this, and I ſhall lay before the conſiderate Farmer, the Advantages and Diſadvantages of each.

In BUCKINGHAMSHIRE, and the neighbouring Counties, the Cuſtom is to turn out the Draught Horſes in the Middle of MAY, into their encloſed Fields of Clover. This is a rank Food, but it is one that gives great Strength and Heart. The Beaſt does his Buſineſs in the more laborious Articles of Huſbandry, more conſtantly and freely upon this Graſs, than any other; and Experience ſhews that he is leſs liable to Colds, and many other Accidents than when fed on the finer Kinds.

In the Conduct of this Matter let me give the Farmer ſome uſeful Hints. Let the Horſes be turned out firſt in the Heat of the Day: and if it be a wet or cold Seaſon, let him take them in at Night, till it is dryer or more favourable.

The moſt healthful Practice is to work them as uſual, while they are at Graſs, taking them up in the Morning, and giving them a moderate Feed of Corn and Chaff, two Hours before they are collar'd; and repeating the ſame after they come from Work. This is of double Uſe, as it keeps them in great Heart; and ſomewhat dries the green and moiſt Food in their Bodies.

In HERTFORDSHIRE it is a common Practice to turn the Cart and Plow Horſes at this Seaſon into a Field of green Vetches, fettering them if there be Occaſion, this is a very ſtrengthening and wholeſome Food.

In other Places the freſh Food is given the Horſes in Racks. To this Purpoſe they mow the Clover, Vetches, or the like, in ſmall Quantities, as they want it, and put it into the Racks. Lucern and Saint Foine may be cut in the ſame Manner with great Advantage.

Another very good Method is to ſow ſome Ground purpoſely for this Uſe with the three Seeds of Clover, Ray Graſs, and common Trefoil together; and cut it freſh for their eating in the Racks: and this keeps them in freſh and in good Heart, under the tighteſt Duty. In theſe ſeveral Methods alſo, by the Help of Straw, there is a great deal of good Dung made for the Service of the Fields.

This freſh cutting of Clover, Vetches, and the like, may be practiſed in Vale Ridge half Acre Lands, as well as in Chilturn incloſed Fields; and it is attended with great Advantage.

Let not any ſuppoſe us deficient in this Part of our Work; becauſe we do not lay down, under the preſent Article, thoſe ſeveral Methods that are preſcribed in Books, and practiſed by Jockeys, of bleeding the Horſes, and all their other Practices upon the Change of Food. It is Idleneſs more than the Alteration of the Diet, that cauſes the ſeveral Ailments into which ſuch Horſes as are bred for finer Services fall, at theſe Seaſons of the Year. The Huſbandman keeps his Cattle to their Labour; and if he does this rightly, it will anſwer the Purpoſe of Bleedings and Drenches much more to his Advantage.

In common Field Lands the Horſe is ſtak'd down with Ropes, where he is put to eat the Graſs: where this cannot be avoided the Farmer muſt be content; but it is a ſorry Method. The Horſe is neceſſitated to drop his Dung and Urine on the Graſs; and he will not eat it immediately after. In this Caſe the Remedy is frequent removing of him, for he will eat the Spot on which he dung'd after a little Time, though he will not while the Taſte is ſtrong in it, and the Dung is there in Subſtance.

An Horſe may be ſtak'd not only on a Piece of Graſs in common Field, but alſo on a Piece of green Vetches, and will thrive upon it very well: but there is the Danger of his breaking looſe in all theſe Places, and in that Caſe he generally does a great deal of Miſchief.

In the ſandy Parts of NORFOLK, and the adjoining Counties, they ſow Turnep for the Summer Food both of their Horſes, and other Cattle. They uſually give it them in the Manger, ſometimes in the Field; and it anſwers very well either Way. The Cattle eat it greedily, and it anſwers both for Oats and Hay.

They uſe a particular Kind of Turnep for this Uſe, known by the Name of the yellow Turnep. The Seed of which is ſold diſtinctly from the others at every Seed Shop. They ſow it in MARCH, and the Turneps are ready to pull at the End of MAY; and they continue ſowing again and again once in ſix Weeks, for a conſtant Supply, till the latter End of SEPTEMBER; in all which Time it keeps the Cattle in excellent

Heart, and enables them to go through their Work equally to any Food whatever.

It may not be amiſs, in ſpeaking of the Management of the Horſe Kinds in theſe Counties, to obſerve a Cuſtom they have of ſpaying their Filly Foals. They do this at a Month or ſix Weeks old, while they ſuck, and it is attended with no Danger. The Mare becomes a particular, and a very uſeful Creature; ſhe grows large and very tough and ſtrong withal, ſo that, in general, ſhe is preferable to a Gelding.

The only Inconvenience theſe ſpay'd Mares are liable to is, the over-growing at the Joints, which ſometimes makes a Weakneſs in thoſe Parts; but this may be, in ſome Degree prevented, by ſpaying them when they are a little farther advanced in their Growth. A very good Time for this Purpoſe is juſt when they are taken from the Dam, when that is done at ſix Months, which is the Cuſtom in many Places, for the cutting heals while they are under the Care of the Weaner.

At the Approach of Winter it is the Cuſtom in moſt Counties, to take up the Horſes, becauſe the Graſs becomes ſhort, and the Seaſon cold: but the Condition of the Creature ought to be the Rule for this, more than the Month of the Year. So long as he can well endure the Weather, and the Food anſwers for him, he will be much better in the Field, than in the Stable: and the ſaving the Expence of Stable Food is no trifling Article.

It is a good Method alſo to moderate between the two Extreams, by taking them into a Stable at Nights, and turning them out by Day; as the Seaſon may require it.

Another more general Way of moderating the Matter may anſwer very well, in the following Manner. Let a ſufficient Number of Hovels be built in the Yard: their Shape to be a long Square, the Front and Ends open, and the farther Side boarded up; and the Top cover'd with Furze, or other cheap Stuff. Againſt the boarded Part are to be fix'd the Mangers; and the Horſes are to have Acceſs to theſe when they like. Thus they run looſe, or are under Cover as they chuſe; and when Oats are given them they feed dry: this does not make them tender like keeping them in the Stable; and is excellent for preſerving their Feet ſound, and keeping them in Health and Heart, and at all Times ready for Service.

It is not underſtood that the Horſes, in this Management, have Liberty to run any farther than about the Yard, becauſe if they had, their Dung would be loſt: whereas, in this Way, all is ſav'd, and that in the moſt beneficial Manner poſſible, and the Horſes eſcape the Confinement of the Stable, which is the Occaſion of half thoſe Diſorders that they are troubled with.

As to the Manner of feeding the Huſbandman's Horſes, in order to make them go through their hardeſt Work with Eaſe and Satisfaction both to themſelves and their Owner, the beſt Way is this.

In Winter let the Perſons who have the Care of them be up at Five o'Clock; and in Summer at Four; and let them bait their Horſes in the following Manner. Mix ſplit Beans, Bran, Oats, and Chaff; or elſe mix Oats, Bran, and Chaff only; and give them a little at a Time, dreſſing them while they are eating. Bran is a very neceſſary Ingredient on this Occaſion, becauſe it makes the Chaff go down, and ſome give it all the Year, accounting that it ſaves Corn, and does the Horſe ſufficient Service, making at the ſame Time all his other Food taſte the more agreeable.

For other Methods, half a Peck of Oats may be given in the Morning before going to Plow, and the ſame in the Afternoon: or after they have baited a little while in the Afternoon, a little Hay may be given them, and they may be led to water. This is a very good Method where a Horſe ſeems to want a right Appetite, for they never fail to eat after it freely.

Chaff mix'd with the Oats is very uſeful upon theſe Occaſions, and a little being given at a Time, the Creature eats it the more heartily and freely, and it digeſts the more perfectly.

But whatever Method be taken, let the Huſbandman be ſure that his Horſe has Food enough; for, whatever he withholds in this Reſpect, is to his own Damage. He ſuffers more by it than the Horſe, for the Creature cannot perform his Work well, nor will he be fit for Sale unleſs to a great Diſadvantage. Many a Horſe have been reduced one half of his Value, by the ſaving a very ſmall Proportion of that Charge in his Food: this is frequently in other Inſtances alſo the Effect of fooliſh Frugality. I ſhall recommend the Huſbandman in all Things to Œconomy, but let it be under the Guidance of Prudence. I have adviſed him to ſpare no Expence in manuring his Lands, becauſe the Crop will be ſure to repay it; and in the ſame Manner he may be ſure that good feeding of his Cattle will be paid him doubly, partly in their going through their Work, and partly in their Improvement for Sale.

CHAP. IX.

Of the Aſs.

THE Aſs follows the Horſe in this Place, not as the next Creature in Value, for he bears in that Reſpect no Proportion to the Horned Cattle; but it is proper to treat of him in this Order, becauſe he approaches in ſome Things to the Nature of the Horſe, and is employ'd in many of the ſame Kind of Services.

The Aſs in London is the moſt to be pity'd of all Creatures; and in many Parts of the Country he does not fare much better. He endures great Fatigue, and his Patience is as a Virtue. This is a Creature that may be made more uſeful than it generally is; and that deſerves much better Treatment than it commonly meets with.

A French Author has written a Treatiſe, to prove that the Aſs is the moſt uſeful to Man of all Animals; he founds this Aſſertion upon its doing a great deal of Buſineſs, and being kept at a very ſmall Expence. But altho' we ſhall not altogether agree with this Writer, yet

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we may with Reaſon endeavour to ſet this Creature upon a more reſpectable footing with Mankind, than that wherein he uſually ſtands.

The Aſs may be purchaſed at a ſmall Price, as well as kept at a ſmall Expence, and is therefore a very uſeful Creature to ſuch as want the Labour of ſome ſuch Animal; and yet have neither Money to purchaſe a Horſe, nor Food to ſupport him.

The Aſs will not only do a great deal of Work, but he will bear all Sort of Inconveniencies in a ſurprizing Manner. He endures Fatigue, Heat, Cold, Hunger and Thirſt better than any living Creature. He is liable to very few Diſorders: is very long liv'd; and retains his Strength and Abilities for doing Service to a very great Age. All this ſhould recommend this Creature to the poorer Sort of Huſbandmen in the ſtrongeſt Manner.

He will live upon a Common be it ever ſo barren, a Whiſp of Straw is very acceptable Food: he will crop Bryars and Thiſtles; and Chaff is a Treat to him. A little more Care might very well be afforded for them than is generally allowed; and they would repay it with very large Increaſe of their Labour.

No Creature is better ſuited to carry Burthens than the Aſs: it will alſo raiſe Water in deep Wells, and work in Mills full as well as a Horſe, and will not ſtand the Owner in near the Expence of the very worſt of that Kind.

But the induſtrious and conſiderate Owner may make them anſwer many other Purpoſes. We ſee Aſſes draw Burthens of Sand in a ſorry Kind of Carts: ill-harneſſed, ill-tended, and under every poſſible Diſadvantage. No doubt but the Huſbandman who ſhould chuſe to employ them in Draught, and would give them but tolerable Tendance, would find his Account in it in many Kinds of Carriage not yet thought of for them.

There is no Queſtion but the Aſs may be made to anſwer the Purpoſe of the Horſe in Plowing; eſpecially in light Lands: and every ſaving to the Farmer being ſo much Gain, here would be a very conſiderable Profit: for the worſt Horſes muſt be fed at a conſiderable Expence to enable them to go through their Labour.

The ſhe Aſs has alſo a particular Value on Account of her Milk, which is preſcrib'd by Phyſicians for many Diſorders; and in London brings a very large Price, although thoſe who keep the Aſſes for that Purpoſe very ill deſerve it, by their Manner of feeding them.

As I have mention'd the Benefits that may attend the keeping of Aſſes, it is reaſonable alſo to name the Inconveniencies: and theſe are principally three. Their Slowneſs, their Stubbornneſs, and the Damage they are apt to do among Trees, no Creature whatſoever devouring the young Shoots ſo greedily.

As to their Slowneſs, it is a Fault they can never be expected to mend, for it is in their Nature: we are to take all Creatures with their natural Imperfections, and this is that of the Aſs: but thoſe Faults are generally attended with Advantages, as this in particular very plainly is. The Slowneſs of this Creature being the very Thing that enables him to continue ſo long at his Labour; and undergo ſuch laſting Fatigue; for if his Motion was quicker, he would tire like the Horſe, and other Animals.

As to the ſecond Charge, his Stubbornneſs and Obſtinacy, 'tis certain that it is well founded, for no Creature is ſo ridiculouſly reſtiff as an Aſs, when he is provoked beyond his Patience, which may be done; or ſometimes without Provocation. Something of this may be in Nature, as well as his Slowneſs; but a great deal of it is owing to his ill Management. No Creature is ſo little regarded, or treated with ſuch wanton Cruelty as the Aſs. He is generally put into the Hands of Boys, or the worſt of Servants, who certainly increaſe his natural Obſtinacy by their Uſage.

Let the Aſs be taken but moderate Care of; and treated a little like a Horſe, tho' it were but like the very meaneſt Kinds of the Horſe, and if he does not become altogether ſo tractable as that Creature, yet he will loſe enough of his natural Fault in this Reſpect to be render'd very uſeful; and will fully anſwer the Care that has been taken of him. This I write from my own Experience.

In the laſt Place, it is indeed likely that the Aſs ſhould crop and ſometimes bark Trees, for they are his natural Food: but it is not particular to this Animal. In the preceeding Parts of this Work we have been oblig'd to give frequent Directions for the defending young Plantations of all Kinds from the croping of Animals; from the Quickſet Hedge to the Timber Tree. The ſame Care that preſerves them from other Creatures, will, in many Caſes, keep them alſo from being damag'd by this; and where that cannot be done, the Creature muſt be kept from them.

If the Huſbandman ſhould take a Reſolution of keeping a great many Aſſes, he might, with a very little Care, keep them out of improper Places; and prevent this Miſchief.

Among other Benefits attending the keeping of this Creature, is to be reckon'd the breeding of Mules, a Thing practis'd to vaſt Advantage in many Parts of Europe, and which it is ſurprizing that we have not introduced to general Practice in England. Of this we ſhall treat at large in a ſucceeding Chapter.

As we have in ſome Manner recommended to the Huſbandman the keeping of Aſſes, we ſhall not leave the Subject without giving him Directions for their Choice.

Aſſes brought from ſome of the warmer Parts of Europe, are greatly preferable to ours in Stature, and for the breeding both of their own Kind and Mules: when we ſee one of theſe Aſſes compared with one of the wretched Creatures of our own Country, we muſt naturally allow the great Advantage of giving the Aſs proper Care and Management, for they are better look'd after in thoſe Places; and their Excellence in every Reſpect is in a great Meaſure owing to that.

Where one of theſe Aſſes can be had, doubtleſs it is to be prefer'd; but this is a particular Caſe. I ſhall ſuppoſe the Huſbandman is to

chuſe out of ſuch as our own Country naturally lays before him; and among theſe let him ſelect ſuch as are bulky, and well ſquared. Such as have large and full Eyes; wide Noſtrils; and long Necks. The Breaſt of an Aſs ſhould be broad; his Shoulders ſhould ſtand high; and he ſhould have a full Back. The Shortneſs of the Tail is alſo judg'd by many a Mark of Strength and Hardyneſs in an Aſs; and ſo far as I have had Experience to judge, I think, with Reaſon.

The beſt Colour for this Creature is dark; the nearer black they are, uſually the ſtouter they are found on Trial; and the Hair lying ſleek, is a good Sign of its being in Health and Vigour.

Let the Huſbandman who intends to ſupply himſelf with Aſſes for the proper Services, chuſe a few in this Manner, with a ſtrict Regard to their Age and Strength; and from theſe let him raiſe a Breed.

The beſt Time for covering the ſhe Aſs is in April or May: the End of March or Beginning of June will do; but earlier or later than the firſt or the laſt of theſe it ſhould not be.

The beſt Age of the Aſs for breeding is five, ſix or ſeven Years: ſhe may be uſed for this Purpoſe from three Years old to ten; but ſhe is in her greateſt Vigour, and will bring forth the fineſt Colts at about ſeven Years old.

A good ſtout he Aſs, and a large bodied ſhe ſhould be choſen for breeding; and ſhe ſhould be wrought gently toward the End of the Time ſhe is going.

Theſe are ſhort and eaſy Directions; and yet they will be found of great Uſe. The Huſbandman who will carefully obſerve them, will be ſure to find their Advantage; and if he add to this Care of breeding them, a very little tending of them when grown up, he will be able to ſhew Aſſes, if not equal to thoſe of ſome other Parts of Europe, at leaſt greatly ſuperior to thoſe commonly ſeen in England: and he will by their Means do a great Part of his common Buſineſs fully as well as with Horſes, and at a much ſmaller Expence.

CHAP. X.

Of the Mule.

AFTER the mention of the Horſe and the Aſs, naturally follows the Mule, that being a Creature produced between the two, and of a middle Nature between the one and the other.

The Mule has the good Qualities of the Aſs without its bad ones. It is as patient of Fatigue, and as capable of enduring Hunger as the Aſs; but then it is as tractable as the Horſe; and is ſufficiently ſwift of Foot for any common Service. When properly bred it is alſo a very handſome Creature: and it is indeed ſo well fitted for ſo many different Services, that nothing can be more worth while than raiſing them in all Places where they will thrive.

The Mule is often of the Size of an ordinary Horſe, ſome are ſixteen or ſeventeen Hands high. They are very ſtrong, and very ſure footed. This is the Quality for which they are valued in many Parts of Europe, where the Roads are mountainous and ſtony; they will go with the greateſt Safety over theſe, where a Horſe would break his Neck.

They perform excellently alſo in Draught; and will travel many Weeks together with ſix or ſeven hundred Weight on their Backs, without any Sign of uncommon Fatigue.

The Mule is bred from the Copulation of an Aſs and a Mare. Thoſe for Travel and Shew are bred from very large he Aſſes and Spanish Mares: theſe are tall and ſtately, their Colour uſually inclining to black, and they are very handſome. But a larger and ſtouter Kind are bred from the ſame Aſſes, and large Flanders Mares. Theſe are frequently ſeventeen Hands high, and as large ſet as our common Coach Horſes. They are much ſtronger than Horſes of the ſame Size, and will bear greater Hardſhips, and be fed at much leſs Expence. At the ſame Time they are much leſs ſubject to Diſtempers. Theſe are great Recommendations of this Creature; and may ſhew how much it would be to the Advantage of the Farmer always to have them in his Yard.

They are extreamly fit for the Saddle, as well as for theſe laborious Employments: they are very manageable, and walk and trot very eaſy. If it ſhould ever become a Cuſtom to breed them in England, they may be ſuited to the Services for which they are deſign'd, by the Choice of proper Mares, for they take after them. Thoſe for the Road ſhould be bred from light made Mares; and thoſe for Cart, Plow, and the like, from the larger bodied and ſtouter Kinds.

There is a very ſubſtantial Reaſon why we ſhould breed them in England, which is, that ſuch as are bred in colder Countries, are always better and longer lived than thoſe in hot. As to the Objection ſome have raiſed of their being vicious, it is a Complaint only made where there are but few of them, and thoſe ill taken Care of; for where they are common, and are treated in the ſame Manner as Horſes, they are as inoffenſive.

Beſide the Mule already mention'd, which is bred between the Aſs and the Mare, and is a light, beautiful, and lively Creature; there is another Kind propagated in ſome Places, raiſed between the Horſe and the ſhe Aſs; but this is an inferior Kind.

It has been obſerv'd, that Foals take more after the Nature of the Female than the Male Parent; and the ſame Thing is ſeen very plainly in the Breed of Mules: thoſe between the Aſs and the Mare, partaking of the Nature of the Mare, being beautiful, lively and ſwift; and only inheriting the good Qualities of the Aſs, his Patience, Strength, and Perſeverance under Fatigue: while on the contrary, thoſe bred from a Horſe and a ſhe Aſs, are of the Aſs Kind, dull, heavy, ſluggiſh, ill-made, and ſmall. There is very little Temptation to breed theſe any where, becauſe the others may be had with as little Trouble. Let the Huſbandman

therefore

therefore who ſhall think of breeding Mules among his Stock, take Care that he does not fall into the Miſtake of ſuppoſing that 'tis the ſame Thing, ſo one Parent be of the Aſs Kind, which of the two it is: he here ſees the Difference.

As the Mare is to be ſuited to the Service for which the Mule is intended, great Care is to be taken to have a proper Aſs. He ſhould have all the Marks of a good one deliver'd in the preceeding Chapter, and above all Things he muſt be large. The fine Mules we ſee in other Parts of EUROPE are bred from the talleſt Aſſes that can be procured; which they purchaſe at a vaſt Price, and of their fineſt Mares. The Mare is put into a hollow Place rail'd in, and the Aſs has the Advantage of higher Ground in covering.

We ſee in this Circumſtance of the Mule, the Abhorrence of Nature to Monſters, or Animals produced of mix'd Breeds. It was believ'd among the Antients, that new Sorts of Savage Creatures were every Year produced in AFRICA, from the Copulation of different Kinds, and the Increaſe of thoſe Monſters ſo produced; but this is an Error; and we ſee in the Inſtance of the Mule, that two Creatures of a different, though like Kind, are very difficultly brought to copulate; and that when they are, altho' they produce a Creature different from either, as the Mule is both from the Horſe and Aſs, yet that Creature is not able to propagate its Kind again.

The Pretence that there is any where a Sort of Mules that produce their own Kind one among another, is as falſe as the new Species of Monſters in AFRICA. The Horſe and Aſs are difficultly got together, in order to the Production of this Animal; but when that is done, there is no carrying the Power any farther.

The Mare is always averſe to receive the Aſs, and in the ſame Manner the ſhe Aſs is unwilling to admit the Horſe to Copulation; inſomuch that where they breed Mules frequently, it is a Practice to make the Aſs colt ſuck a Mare: and the Mare foal ſuck an Aſs, in order, as is imagin'd, to make them in ſome Degree partake of the Nature of either. This has no real Effect, but I have named it to ſhew how ſenſible the Breeders of Mules are, that thoſe Creatures do not go freely and willingly together: and it is certain, that there is not in Nature any Power of the Mules generating its own Kind again.

CHAP. XI.

Of the Bull, and his Kind.

UNDER this general Head are included, the Bull, Cow, Ox, and Calf, each of them a very conſiderable Article in the Huſbandman's Profeſſion; and though all of one Kind, yet for Clearneſs ſake, to be treated of ſeparately and diſtinctly. The Cow is naturally conſider'd as the principal, though the Female, becauſe ſhe is the moſt univerſally uſeful to the Farmer; but before we enter upon her Nature and Qualities, we ſhall treat of the Bull in his natural Condition, and in that of the Ox; as a Knowledge of them will beſt lead to the other.

In other Countries there are Bulls of ſeveral Kinds and Forms, under the Name of Buffaloes, and the like Diſtinctions: but in ENGLAND we have properly only one Kind.

The Bulls of ENGLAND, however, tho' they are of the ſame in Kind, differ in their Size, and other leſſer Circumſtances, according to the Counties from whence they come, or in which they are bred. The different Parts of this Kingdom afford ſo different Paſturage and Support for Cattle, that they are eſtabliſh'd in them under certain Diſtinctions; and when they are brought into others, are called after the Name of the Place whence they came. Thus the LANCASHIRE breed is large, the WELCH are ſmaller, and the SCOTCH leaſt of all. In STAFFORDSHIRE they are commonly black, and in GLOUCESTERSHIRE red; and they have the like Differences in other Counties.

The Huſbandman who is about to ſtock his Farm, ſhould be acquainted in general with the ſeveral Breeds, that he may be able to ſuit his Purchaſe to his Land.

The larger and finer Kinds are bred where there is good Nouriſhment, and they require the ſame wherever they are kept, or they will decline: and, on the other hand, the poorer and ſmaller Kinds which are uſed to hard Fare, will thrive and fatten upon a moderate Land, becauſe it is richer than what was naturally their own.

The Huſbandman will do well to remember here what we have laid down concerning Trees, that they never thrive if tranſplanted out of a rich into a poor Soil; and the ſame holds good in Cattle: let him never remove them from rich Lands to poor ones.

Every Huſbandman ought to have one of theſe three Conſiderations principally in View, in ſtocking his Land with this Kind, the uſing them principally for Breed, for Milk, or for Work; and according to which of theſe three is his principal Aim, he is to make his Purchaſe: one Breed being fitter for one of theſe Uſes, and another for another.

He is alſo to conſider the Degree of Richneſs of his Paſtures, that he may ſuit the Breed accordingly to that alſo. Thus if his Ground be perfectly rich, he ſhould buy the largeſt and fineſt Cattle, the DERBYSHIRE, STAFFORDSHIRE or LANCASHIRE Kind; if poorer he ſhould purchaſe the ANGLESEA or WELCH, for they will thrive and fatten upon very moderate Ground: and in the ſame Manner he ſhould ſuit his Cattle to the Nature and Qualities of his Paſture, be they whatſoever they will.

Whatever Breed the Huſbandman chuſes, he is to take Care that he keep entirely to it; that is, the Bull and Cows are to be all of the ſame Kind; for it is a general and very true Obſervation, that a mix'd Race does not ſucceed ſo well in any Place, as where they are all of a Sort.

Having premis'd thus much of the ſeveral Breeds of theſe Cattle, on which Head we ſhall

enlarge farther under the Conſideration of each particular Kind in the ſucceeding Chapters, we ſhall here proceed to ſpeak of the Bull in general: not as of any particular Kind, but of whatever; for the Marks of a good Bull, are the ſame in general in all the Breeds.

In the Choice of his Bull let the Huſbandman guide himſelf according to the following Directions. Let his Forehead be broad, and the Hair upon it well frizzled and turn'd in ſmall Curls. Let his Countenance be ſharp, his Eyes large and full, the blacker the better. Let his Horns be moderately long. His Neck thick and fleſhy; and his Body long and large. His Breaſt ſhould be big, his Back ſtrait and flat, his Buttocks large and ſquare, and his Thighs round. His Legs ſhould be ſtrait, his Joints ſhort, and his Hair ſhould lie ſmooth and even upon his Body. This Sort of Bull anſwers the beſt in every Reſpect for Breed. The Oxen from him are always inclin'd to be large and ſtout; and are fit for draught as well as feeding.

Thoſe who are very curious in their Breed, obſerve that the Ears of the Bull be rough within, that his Noſtrils be wide, and his Dewlap thin, long and hairy; that his Tail ſtand high, his Knees be large and round, and his Hoofs long and hollow. Theſe are Marks of leſs Conſequence, tho' ſome ſtand upon them with great Strictneſs: a very good Bull may be without them; or without any Thing particular in any of theſe Parts; but if he anſwer the Deſcription in all Points it is ſo much the better. The others before deliver'd are, however, of great Conſequence, and the Huſbandman's Intereſt requires him to obſerve them ſo ſtrictly, that he ſhould never admit a Bull among his Cattle, that does not anſwer to them.

The Breed in this, as in moſt other Kinds, partake more of the Nature of the Female than the Male; yet there is ſo much depends upon the Male, eſpecially in the Form of the Ox, and moſt particularly when they breed that Creature to labour; that the Owner can never be too particular in his Examination of the Bull, which is to be the Father of his Breed.

The Uſe of the Bull is commonly underſtood to be only in the Service of the Cows in Propagation; and accordingly in moſt Places, he is ſuffer'd to run looſe, living a quiet Life, with no Care but his Pleaſures. This, however, is not neceſſary. The Bull is an Animal of Strength as well as the Ox, and there is no Reaſon why he ſhould not be employ'd in the ſame Manner. This is not univerſally practis'd, but by an Account we have receiv'd from a very worthy Correſpondent on theſe Subjects, who writes nothing but what he has try'd, it is very plain that it may be introduced any where with Advantage. I ſhall here inſert his Letter as it lies before me, in his own Words, and without Addition or Deviation.

To ****.

" Whereas you have deſir'd me to let you " know any Thing that ſhould fall in my Way in " the Courſe of Huſbandry not commonly prac- " tiſed, I take this Opportunity of acquainting " you with a Uſe I have found for my Bulls.

" You know it has always been my Prac- " tice to raiſe more of this Kind than others do " with ſuch a Stock as mine; but I fancy they " generally don't allow Bulls enough to their " Cows, and that the Breed ſuffers by it. How- " ſoever that be, I keep a larger Number, and " feeding them ſeparate, I ſeldom have any " Miſchief among them. But it came into my " Thoughts that I might as well have ſome " good of them beſide juſt the Breed, and not " keep ſo many large Creatures only for that " Service. Upon this I began to think of ſet- " ting one of my ſtouteſt Bulls to labour.

" You are ſenſible that this is not a County " any more than yours, where they put their " Oxen to draught: ſo whether or no they uſe " the Bulls in thoſe Places for the ſame Work, " I can't tell: but by what I hear, I believe " not.

" I try'd one of my ſtrongeſt Bulls firſt at " Cart. We had ſome large Timber to carry, " and I made them put the Bull to the Car- " riage that we uſed. He was a little ſtubborn " at firſt, but after four or five Trials he would " draw very well. I find him ſlow but very " ſtrong, and he anſwers exceedingly.

" I uſe him not only in the Carriage of Tim- " ber; but in drawing the Clay from the Nor- " field Pit, to the ſandy Piece you adviſed me " to dreſs with it, and he will pull a vaſt Load " with Eaſe.

" I have try'd to put a Couple of them to a " Cart together, but they do no better than one, " for they will never draw equally. One pulls " all, and the other lags, or walks eaſy. I have " alſo try'd to yoke them for plowing, but it " does not do. But the firſt Bull that I broke to " drawing, works very willingly at Plow alone, " and I have turn'd up my heavieſt Soils with " him.

" You ſee I write freely what can be done, " and what cannot, ſo far as my ſmall Practice " informs me; I have computed all Things, " and am convinced that it would be very much " to the Advantage of Huſbandry, if Bulls " were made to work every where. I have " been able yet only to make them draw ſingly, " but perhaps others upon more Trial, may " bring them to go together.

I am,

Your humble Servant,

R. G.

It is needleſs I ſhould add any Remarks on this plain Letter. It is in every ones Power to try whether Bulls Labour anſwers according to this Account; and, if ſo, it will be worth while to try how far they may be brought to work together: not that in this Caſe they are of equal Value with the Ox, who, beſide his Labour, has his Fleſh for Market: but there is no Reaſon any Part of the Huſbandman's Stock ſhould lie idle. The Bull feeds, and he ought to work. Being properly employ'd he will not be at all the leſs fit for his Buſineſs in propagating the Species: rather the fitter.

The Diverſion of running and baiting the Bull at certain Times of the Year is very old, and has

has been practiſed in many Parts of the World, and in moſt of them at the ſame Seaſon. We ſeem to have had it from the SPANIARDS, whoſe Bull fights are famous; and they from the ROMANS, as the ROMANS had it from the GREEKS. JULIUS CÆSAR brought it to ROME, and he profeſſedly learned it of the THESSALIANS. In GREECE, ROME, SPAIN and ENGLAND, the Seaſon for it has always been in the Month of AUGUST.

The Bull is often miſchievous; but it is in a great Meaſure owing to his being kept idle. Many a Life is loſt in ENGLAND by this Creature: but probably if it ſhould ever become a Cuſtom to train them to labour like other Animals, there would be an End of that Miſchief. The Bull is the only Creature of ſuch Size and Power that is left to himſelf. If he were worked, partly the Labour, and partly the being accuſtomed to Mankind by their tending of him, would tame him, and make him as harmleſs as Horſes and other Animals. They are often naturally vicious as well as the Bull; but it is their being continually in the Way of Management that breaks them.

CHAP. XII.

Of the Ox.

THE Naturaliſt would ſmile at our treating of the Bull in one Chapter, and the Ox in another; but we know as well as he they are the ſame Creature under different Accidents. Their Uſe to the Huſbandman is, however, ſo different, that in a Work of this Kind we are very well juſtified in treating of them in this ſeparate Manner.

If the Huſbandman's Land be rich, let him ſtock it with the largeſt Oxen that can be rais'd, for they are much the moſt profitable.

The YORKSHIRE Oxen are in general, black all over, and they are very large, firm and valuable Kind in every Reſpect. There are none that exceed them for Labour, and few feed like them. The Oxen of STAFFORDSHIRE, and many of the neighbouring Counties, are alſo of this Kind. The Oxen of LINCOLNSHIRE are in general red and white: they are very bulky, and equal to any in Value. The Oxen of SOMERSETSHIRE, and ſome of the adjoining Counties, are naturally red. Theſe are alſo a very fine, large, and valuable Breed.

If the Huſbandman intend to breed his Oxen to Draught and Labour, the black YORKSHIRE Breed is the beſt: if for Market only, LINCOLNSHIRE are preferable: the red SOMERSETSHIRE Ox is indifferent to either Uſe, and is an excellent Kind.

Of all theſe the LINCOLNSHIRE Breed require the richeſt Paſture: but none of them will thrive, or come to their Perfection, unleſs they have very good feeding.

The Reader is not to ſuppoſe from what is here ſaid, that all the Oxen of YORKSHIRE are black, all thoſe of GLOUCESTERSHIRE and SOMERSETSHIRE red, or all the LINCOLNSHIRE Oxen pyed.

Theſe are the genuine and proper Breed of each of thoſe ſeveral Counties; but the Graziers have mix'd them more or leſs in each County, though 'tis beſt both for Beauty and Service to keep them ſeparate: their Kinds and Diſpoſitions being in each Particular, as well as the Colour.

The Huſbandman who intends to ſtock his Land with either of theſe Kinds, muſt at firſt buy, but he is afterwards to breed; and in order to keep up the Sort with Certainty, he muſt take Care to have a right Bull, and well ſized Cows, both of the ſame Breed; and from this Stock, with a Sufficiency of Paſturage rich enough for their Support, he will not fail to have either Breed in any County: perhaps better than they are to be found in the Places themſelves, as they do not take due Care there, but bring in one Kind among another.

The Oxen ſhould be tall, full bodied, ſhort jointed, and well put together in every Part, ſo that one ſees their Strength. Their Hair ſhould be fine, and lie ſmooth, for that betokens Health, and a good Kind.

The Strength of the Ox is very great, and he has Patience to endure Fatigue, but he is ſlow, and muſt not be put beyond his natural Pace. He will not work eaſily or freely, if this be attempted, and what is worſe, fretting and hurrying throws him into Diſtempers.

'Tis but in ſome particular Parts of ENGLAND they now breed their Oxen to Labour, but it is very profitable. In theſe Places the Huſbandman cannot be too much warn'd againſt his hurrying them in their Employments; for he ſhould conſider that they are to be fed as well as work'd; and while he makes them thus liable to Diſtempers, he takes them off from the one, and makes them incapable of the other.

When Oxen are to be train'd to labour, they muſt be firſt put to work at three Years old, but they muſt be brought to it gently, and, by Degrees, in the Manner of a young Horſe; for if they be puſh'd or work'd too hard at this Time, they are ſpoil'd for ever.

Great Care muſt be taken to match ſuch well as are to draw together, for otherwiſe they draw unequally, and ſpoil both the Work and one another.

In this Caſe of matching them, Regard muſt be had to three Things; their Height, their Strength, and their Spirit: for ſome are tall that have not much Strength; and others have a great deal of Power that are ſluggiſh.

In general they are very tractable and gentle, but regard muſt be had to their ſeveral Natures, for they will not be forced out of them by any Uſage; and they may be greatly injur'd in the Endeavour.

Of all the Kinds the pyed LINCOLNSHIRE Ox is the fitteſt for Labour. He is naturally long bodied, and till put up to feed, is leſs fleſhy than any of the other good Breeds; tho' he takes to fattening very readily with Reſt, and a good Paſture.

When the young Oxen are firſt put to work, a great deal of Care muſt be taken not to over-heat or fatigue them. They muſt be ſuffer'd to reſt in the Middle of the Day in hot Weather,

Weather, and the Servant ſhould give them ſome Hay, which will ſupport them in the new Fatigue of their Labour, much better than Graſs. They muſt be well fed during the whole Time of their labouring, for they will not do much if they be not kept in Spirits by good Nouriſhment; but in this let the Huſbandman underſtand Moderation: for there is Difference between feeding them for Strength, and for fattening.

An Ox for Labour muſt neither be bare, nor muſt he be too fat; in the firſt Caſe he will be weak, and in the other he will be lazy. They ſhould be treated gently, for they do not underſtand Blows and hard Uſage, and may eaſier be beaten into Sickneſſes and Diſorders, than into Labour.

In this Way an Ox may very well be kept to work ſeven or eight Years, that is, till between ten and eleven Years old; and in that Time he will do the Owner an incredible deal of Buſineſs, provided he thus underſtand how to manage him, for it all depends upon that; otherwiſe he will be as ſtubborn as an Aſs, and will not be fit half his Time for Service.

Sometimes a young Ox will prove very ſtubborn, vicious and unruly; but this, when enquir'd into, will be found owing to ſome bad Uſage at ſetting out, for the Ox has nothing of that bad Diſpoſition in his Nature. When this happens he muſt be kept hungry; and when he has faſted long enough, he muſt be made to eat out of the Hand: when he is brought to his Labour, he muſt be tied with a Rope; and at any Time when he grows faulty, he muſt be cheriſh'd, and fed with a mouthful of Hay by hand; thus bringing him by ſoft Means to Quietneſs, and a Readineſs in performing his Buſineſs; for nothing elſe will do with this Creature.

For the breaking a young Ox to the Field, no Way is ſo well as to ſingle out one of the tameſt of the old ones, that is of its own Size; and yoke them together. Let them be put to ſome ſlight Work, and ſuffer'd to do it eaſily and ſlowly: they will thus draw equally, and the young Beaſt will become perfectly familiar to it. They will be apt to get into too ſlow a Gait at firſt, but by Degrees they muſt be ſpirited to be a little briſker in their Pace; and after half a dozen Times going out with this quiet Beaſt, the young one muſt be coupled with an Ox of more Spirit, that will learn him to go quicker. Thus he is to have his Companion chang'd from time to time, till in the firſt Month or ſix Weeks of his Labour, he gets to draw with the briſkeſt of the Stock.

This is the only Way to get the Ox to his Speed; for at beſt it is not great, nor will he be brought to it by force.

The Advantages of labouring with Oxen are ſo great, that it is wonderful the Practice does not extend farther. The Ox of eleven Years old, when he is unfit for Labour any longer, may be fatten'd as well as at any other Time; and in the ſame Manner if he fall lame, or by any other Accident be ſpoil'd for Labour, at whatever Age that happen, he may then be fed up for Sale.

In this the Ox has a great Advantage over the Horſe, which, when aged, or ſpoiled by Accidents, is good for nothing, and becomes an entire Loſs, and often a very great one to the Farmer.

The Food of the Horſe is alſo a very expenſive Article to the Huſbandman, but that of Oxen is cheap. They require no Oats. They are very little liable to Diſeaſes, whereas one is never ſecure of a Horſe at all. But though the Ox does not require ſo expenſive Food as the Horſe, yet ſuch as he eats muſt be good in its Kind, and he muſt not be ſtinted. He muſt always have good Graſs to go to, and good Hay in Winter, elſe he will be of little Service: for though he muſt not be fatten'd in his Time of working, yet if he be not kept well fed, and in good Spirits, he is worth nothing.

The greateſt Uſe of the Ox in the Way of Labour, is that of Plowing; and 'tis that for which they are ſuited by Nature. They will work at this in the tougheſt and heavieſt Grounds as well as Horſes, and do as much in a Day. They do not ſerve ſo well for drawing of Carts and Waggons; and are not fit to be uſed much in Places where the Roads are good.

In moſt Counties the Farmer would do well to train up ſome of his Oxen for Draught, tho' it is better not to depend upon them entirely for that Service, in any. We have ſhewn for what they are moſt, and for what they are leaſt fitted. Every Farmer has Occaſion both for Carting and Plowing; and the Horſes are in general fitteſt for the former, and the Oxen moſt profitable for the latter: therefore when there are more Teams than one kept, ſome ſhould be of Horſes, and others of Oxen, proportioning the Number of either to the Nature of the Service, and of the Roads and the Ground. The Farmer who keeps two Teams only, will almoſt always find it his Intereſt to have one of them of Oxen, and the other of Horſes.

In clayey Lands, the Oxen are moſt uſeful; and in chalky Countries the leaſt. The Chalk ſoon ſpoiling their Feet.

It is a Cuſtom in ſome Places where Oxen are uſed for Draught, to yoke them by the Horns, but this is awkward and troubleſome. It is left off in many Places where it was once uſed; and ought to be in all. The common Way of yoaking them together by the Neck and Breaſt is vaſtly preferable.

Whenever the Farmer comes to a Reſolution of keeping Oxen for Labour, let him at the ſame Time provide for a proper Supply of them; and ſee that it be rather too much than too little, for it will always be more to his Profit to ſell what he does not want, than to buy for his neceſſary Uſes. To this End he ſhould rear at leaſt two Oxen and two Cow Calves every Year to keep up his Stock; and put his old, or injur'd Beaſts to fatten, and ſupply their Places from this Breed as Occaſion requires: for an Ox, as before ſaid, whether put out of the Team for Age or Injuries, will fatten as well as at any other Time, and will bring a good Price at Market; and afford as good Beef as any other that had not been work'd.

When the Huſbandman buys in Cattle to fat-

ten, it ſhould be either in Spring, or toward the Beginning of October. Thoſe Oxen which are bought in early in Spring will, with proper Care, be fat in July, August, or September, according to the Goodneſs of the Soil, and the Manner of feeding them; and according to the Condition wherein they were bought. An Ox that is very forward when bought in, and is turned into a very rich Paſture, will be fit for Market in ten Weeks; but there is no need that every Ox that is bought for this Purpoſe, ſhould be in this forward Way; or that every one ſhould be haſten'd to a Market Condition in that Hurry. The Care of the Huſbandman in this ſhould be, to ſuit his Endeavours to the Nature of his Grounds, and to the beſt Demand for the Cattle: he may keep on fattening the whole Summer Months, and anſwer his Purpoſe better both for the Market, and for having the beſt Service out of his Land, than if he haſten'd up all that he bought, or bought only very forward ones.

Thoſe Oxen that are bought in about the Beginning of October, will in general be fit for Sale early in the following Spring. There requires ſome Management in this Article of the Huſbandman's Buſineſs, for without it he may loſe by his Induſtry, but with due Care he will find a ſufficient Profit in this Way. Theſe Cattle being for Sale early in Spring, will always fetch a good Price; but the Winter feeding of them may eaſily run away with what ſhould be his Profit.

The Method is to forward theſe in Fleſh, before the Winter ſets in hard; and then to take Care only to keep them up in Fleſh during the hard Time, with Hay or Turneps.

They may be thus kept in a Condition for Market whenever it is worth while to ſell them; and be ſure of fattening up with great Eaſe very early in Spring, to a certain Advantage.

Another Way of buying Cattle in the Beginning of October, to great Advantage, is to purchaſe lean young Oxen which will pay for their Winter Keeping by their Growth, and be ready to fatten up early in Spring, to the faireſt and fulleſt Profit.

Another very good Time of buying Oxen for feeding is in August, or the Beginning of September. Theſe ſhould be got forward as ſoon as may be, by putting them into very rich Paſtures; and they will be ready for the Winter Sale.

This is the beſt Method the Huſbandman can take, who has rich and fine Paſture Ground; for no other will ſupport the large and valuable Breed of theſe Oxen. But he who happens not to have this Advantage, is not altogether to decline thus much of the grazing Buſineſs, which to the other proves ſo very advantageous.

Therefore he who has but moderately good Paſturage, and is inclined to deal this Way, ſhould ſet about in a different Manner. Let him buy in a Number of young Welch Heifers, inſtead of Oxen, in August or September, and put them into the beſt of his ordinary Paſturages. He is to take his Chance whether theſe prove with Calf or not, but either Way they will anſwer his Purpoſe.

If they prove with Calf his Buſineſs is to keep them till Spring, and then he will ſell them to a good Advantage, with a Calf by their Side, for the Dairy. If they do not prove with Calf they will preſently begin to fatten upon his Ground, which, though poor, is yet very fine in Compariſon of what they have been uſed to; and he will be able to ſell them out at a very good Account at Christmas or in Spring; at both which Times Meat is dear, and conſequently Cattle fetch a Price.

Theſe Heifers will, to the Huſbandman thus ſituated, anſwer, in ſome Meaſure, the Purpoſes of Oxen; and he is not to complain they do not bring altogether ſuch a Price; becauſe neither the Cattle themſelves, nor their Keeping, have coſt him ſo much as in the other Inſtance. Such Land being cheaper than the rich and fine Paſture Ground, on which the large Oxen may be fattened.

But there is this to be conſider'd, that the Advantage will be the greater, in proportion as the Farmer has the Convenience of Hay, or Turneps, which are the two Foods for Winter fattening of Cattle; and in Proportion to his Nearneſs to ſome large City, where the Demand and the Price will anſwer to the expenſive Feeding of Hay. About great Towns they may afford to let a Beaſt eat a Couple of Load of Hay in a Winter, becauſe the Demand is certain, and the Price good: but this will not do in remote Places.

Let the Huſbandman who buys Cattle for fattening, take great Care in the Choice, for on that will depend a large Share of his Succeſs. Let him examine their Bulk and Shape, and the Forwardneſs they are in at the Time, and after that proportion the Goodneſs of the Paſture to their Kind.

Thoſe that are intended to be kept up for a Winter, or early Spring Market, muſt be turn'd out in September into the Rowens, till the Weather become ſevere by much Snow or a very hard Froſt; and till this Time they will not need any Fodder.

Upon the coming in of the hard Weather they muſt have ſome Hay regularly every Morning and Evening, which muſt be proportioned to what the Ground ſtill affords. The more they find there the leſs they want of the Supply; and the leſs there is, the more Hay muſt be each Time given them.

The Froſts have an Effect upon Graſs, eſpecially upon the worſt Sorts, to ſweeten it. The ſower Graſs which the Cattle had left untouch'd for a great while, becomes palatable to them after two or three Nights good Froſt, with a large white Ryme. They will eat this greedily; and it will make Hay the leſs neceſſary, till the Snow covers it, and they cannot get at it. 'Tis at theſe Times the foddering is to be largeſt and beſt, for without a due Care they will, in a little Time, loſe all the Advantage they had made in many Weeks.

For thoſe Oxen that were bought in lean, and are not got into any great Degree of Fleſh by the Beginning of the hard Seaſon, Straw will do inſtead of Hay: and the Huſbandman muſt begin with Barley Straw, and then come to Oat Straw, both which are very good Food to Cattle in this Condition; and will keep them as they

are, and in a Readineſs for any farther Improvement, when it comes upon eaſy Terms.

Toward the End of Winter the whole Product of the Ground that has been thus fed, will be eaten up, and then the Oxen are to be taken into the Yard. If the Huſbandman have Oxen in two Conditions, the one that he feeds with Hay, and the other with Straw, they muſt be put up ſeparate; and their Food muſt be put in Racks for them.

The Farmer often complains that his Cattle will not eat their Fodder, when they are taken up into the Yard, though they did freely when it was given them in the Field. But this is generally owing to the Folly of giving them too much at a Time. I have often ſeen an Ox eat heartily and freely out of the Crib for a Time, till when he had often breath'd upon it, what was left became quite diſagreeable to him.

This is a Delicacy in the Nature of the Animal, and nothing can break him of it; but all the Inconvenience of it is eaſily prevented, by giving theſe Cattle a little at a Time, and often. This being, for all Reaſons, the beſt Way of foddering all Cattle in the Yard.

Let the Huſbandman take Care that his Yard be well ſhelter'd, and kept dry. Let there be Straw enough ſcattered about it, that his Cattle may lie ſweet and warm, this will greatly aſſiſt in keeping them in good Caſe; and he need not grudge the Expence, for what the Straw is worth will be many Times over made up to him in Dung. Their trampling this Litter, with their Dung and Urine, converts the whole into a very rich Manure; and the Quantity becomes ſo conſiderable, that it is an Article of great Conſequence.

When Oxen are put to be fattened on Land, they may be turned in either alone or with Horſes; or they may be put into the Paſtures firſt, and the Horſes afterwards. Which ever Way is uſed let the Huſbandman take Care of the Time of turning in his Oxen. Many think they ought to let the Graſs be very well grown before they put them to feed upon it; but they are greatly miſtaken. There is not a greater Diſadvantage the Farmer can lie under, in this Way, than the having his Paſtures too high grown before he puts the Beaſts into them.

The Ox is a nice Creature, and does not love a rank Graſs. In this Caſe they only nip the Tops, and the Remainder rots upon the Ground. When Graſs is grown too high, in Autumn eſpecially, it becomes ſower, and the Cattle will not eat it freely before the Froſt has ſweeten'd it to their Taſte.

If it happen the Farmer have at this Seaſon of the Year, a Paſture Ground of tall Graſs, the beſt Method he can follow is this. Let him firſt turn in his Oxen in a proper Number, and they will eat off the Tops; but as they will meddle with no more of it, when this is done they ſhould be removed out of it. Horſes are then to be turned in, who, not being ſo nice as the Ox, will eat it down lower; and after theſe he may feed it with Sheep, which will ſtill find a great deal for their Purpoſe, that the Ox and the Horſe had both left.

If the Paſtures in the Farmer's Grounds be all of nearly the ſame Kind, and all of a proper Graſs for feeding of his Oxen, ſtill let him frequently change their Place, removing them from one of the Cloſes to another. This anſwers a double Purpoſe, it gives the Cattle a Variety of Food; and it gives every Piece of the Ground Reſt at Times to ſhoot afreſh after their eating. Their Taſte is ſo nice as to diſtinguiſh the Growth where it appears to our Eye all the ſame; and therefore they will be pleaſed with removing from one Ground to another: and each Cloſe will ſhoot up with Spirit and Freſhneſs from their cropping of it, when it is quiet for a little Time from the treading of their Feet.

Let the Huſbandman always purchaſe as large a Breed as his Ground will maintain; and by this Management he will find it ſupport a better Sort than perhaps he might imagine it could, or than it in Reality would do in the Hands of a leſs ſkilful Perſon. The Size of the Ox is a vaſt Article, for it makes great Addition both in the Fleſh and Tallow.

Let the Ox have a ſmooth Forehead and a deep Belly, if he be intended for fattening. The Strength of his Joints is more the Matter when he is firſt deſigned for Labour.

In buying Oxen for fattening Preference is to be given to the young; but if they be ſomewhat older let the Farmer ſee that they are healthful. Let him feed up his own Breed for Slaughter, if he uſes their Labour till the beſt Time of their working is over, as before directed; but let him not bring them in for fattening at that Age, without he bargain accordingly.

It is always a good Sign of Health that an Ox frequently licks himſelf. It is a Proof that he is in good Humour with himſelf, and in Spirit; for when they grow ſickly, dull, and droniſh, they utterly neglect themſelves, and their Coat becomes rough, and ſtares for want of this little Care of their own, which keeps it in order.

Nevertheleſs, every thing is to be underſtood within the Bounds of Moderation. This licking of himſelf, which is in general a Sign of Health in the Ox, may be a Diſeaſe. They will ſometimes lick till they cannot eat, for they ſwallow a great many of the Hairs they lick off, and they will ſometimes get together into a Kind of Ball in the Stomach, which will impair the Creature's Health. In this Caſe the Owner muſt, at Times, waſh the Ox with a ſtrong Decoction of Wormwood, which is a Taſte it abhors; and finding this Bitterneſs on the Skin, it will be cur'd of licking; as Children are wean'd by rubbing the Nipple with Aloes.

Some, for this Purpoſe, cover the Creature with his own Dung, but this is a filthy Way. As the licking is always done for the Sake of Cleanlineſs, the Ox will often tire himſelf, from Day to Day, with endeavouring to get this off; or elſe he will utterly neglect himſelf, which will prove of as bad Conſequence.

I am a great Friend to the eaſy and cheap Practices of the common Farmers, but they are not always right. This is often hurtful.

In examining how the Ox proceeds in fattening, the ſureſt Way is to feel the hindermoſt Rib. If all be ſoft and looſe about that, 'tis a Proof that the Creature is getting into good Fleſh. The Part behind the Shoulders in an Ox, and the

the Navel of a Cow, are the Parts to be examined, to know how they encreaſe in Tallow.

Finally, there is one Thing I ſhall recommend to the Huſbandman very ſtrongly, from my own Experience, as excellent toward the fattening of Cattle, and this is the bleeding of them at proper Times. This ſhould be done once at leaſt, and commonly it may be done twice with great Benefit during their feeding.

The Method I have always obſerved is this in the Cattle I have bought, in Spring always to bleed them as ſoon as I put them to Paſture, which makes them take to fattening directly. In thoſe I buy in Autumn I follow the ſame Method of bleeding, at the Time of turning into good Paſture; which I find not only help their fattening, but prevent Diſorders. This is all I do with thoſe intended for the Winter Market; but for ſuch as were bought lean to be kept for growing in Winter, and fattened up in Spring, I always have them blooded twice, once when they are bought in, and a ſecond Time early in Spring, when they are going into the Paſture for fattening.

My Neighbours allow that my Beaſts are leſs liable to Sickneſſes than any about the Place; and I attribute it to nothing ſo much as theſe Bleedings; notwithſtanding that ſomething is to be allowed for the Care I take in other Articles, which is greater than moſt others.

For thoſe Cattle which I buy in, lean in Autumn, for the Spring Market, I always mix Straw with the Hay I give them, by way of Fodder. I find Barley Straw does better for this Uſe than any other; and the Quantity I allow is one third Part of the whole. This anſwers for thoſe Beaſts full as well as Hay alone, and in the Affairs of Huſbandry every little ſaving is to be regarded; for all comes to ſomething.

CHAP. XIII.

Of the Cow.

WE have occaſionally mentioned the Cow in treating of the Ox, as ſometimes it is convenient to breed her in the Place of that Kind; but we now come to conſider her in another Light, in which ſhe is the moſt valuable and uſeful Part of the Farmer's Stock; this is as a Milch Cow, and with her Calf.

The ſeveral Products made from her Milk will come to be conſidered hereafter in their Place. At preſent we are to treat of the Creature herſelf, for we are, in this Place, ſpeaking of the Huſbandman's ſtocking of his Farm; not entering into every Article that may be produced from the ſeveral Kinds, of which properly hereafter.

The Cow being chiefly intended for the Service of the Dairy, a great deal of Care is to be taken in the purchaſing a right Kind, for there is a vaſt Difference in the Profit of this Animal, according to the Breed from which ſhe comes.

They have large Cows in all thoſe Counties where they breed the large Oxen, mentioned in the former Chapter, but the Size is not all that the Huſbandman is to conſider: the Quantity of Milk is not always proportioned to the Bigneſs of the Beaſt; and that is to be his chief Regard.

The WELCH and SCOTCH Cows will do upon the pooreſt Paſtures. They will ſuit ſome who cannot riſe to the Price of the better Kinds; and they will yield a very good Quantity of Milk if rightly managed; but the fine Kinds are the DUTCH and ALDERNEY Cows, theſe are very like one another in Shape, and in their Goodneſs, but the ALDERNEY Cow is preferable, becauſe ſhe is hardier.

The fine DUTCH Breed have long Legs, ſhort Horns, and a full Body. They are to be had in KENT and SUSSEX, and ſome other Places where they are ſtill carefully kept up without Mixture in Colour, and where they will yield two Gallons at a milking: but in order to this they require great Attendance, and the beſt of Food.

The ALDERNEY Cow is like the DUTCH in the Shortneſs of her Horns, but ſhe is ſomewhat ſtronger built, and is not quite ſo tender. She requires rich feeding; but is not liable to ſo many Accidents as the other, and is equal to her in the Quantity and natural Goodneſs of her Milk.

Of which ever Kind the Huſbandman determines to have his Cows, let him take the following Rules for his Direction in their Choice. Let them have the Forehead broad and open; the Eyes large and full, and, excepting only the DUTCH and ALDERNEY Breeds, which are naturally ſhort horned, let the Horns be large, clean, and fair.

They have, in ſome Parts of BUCKINGHAMSHIRE alſo, a Kind that have no Horns, they call theſe the polled Breed. They are to be choſen principally by the Breadth of the Forehead; for their Eyes are leſs full by Nature, than thoſe of many of the other Kinds.

Of whatever Breed your Cow be let her Neck be long and thin; her Belly deep and large. Let her Thighs be thick, her Legs round and well-ſhaped, and her Feet large. Above all Things ſee that ſhe have a large, good, white, and clean looking Udder, with four well-grown Teats.

Of whatever Breed the Cows be, let the Bull be of the ſame. And let them generally be of as large a Kind as the Paſtures will ſupport in Health and Strength. But it is better to have a Cow of a ſmaller Kind well fed; than one of the beſt Breed in the World ſtarv'd.

It is a general Obſervation among the Farmers, that the red Cow gives the beſt Milk, and the black Cow is beſt for her Calf, which is uſually fairer and healthier than that of the red. But this is not founded on Fact, it is rather Fancy. The red Cows Milk has been long famous; and a Calf of a black Cow is accounted good to a Proverb; but the Breed is the Thing of Conſequence, not the Colour.

The Cow that gives Milk longeſt is the moſt profitable to the Huſbandman; and from what I have obſerved, this is moſt the Caſe with thoſe which are neither very young, nor advanced into Years.

The beſt Time for them to calve is in the Beginning of APRIL, this is moſt favourable both for the Calf and for the Dairy.

The Huſbandman ſhould take Care to know rightly the Time of his Cows being to calve; and three Weeks before that, he is to feed her better than uſual. She ſhould be put into a rich Paſture, if the Seaſon be ſo advanced that there is a good Growth of Graſs any where: if not ſhe muſt be well fed with good Hay. And this will be returned many-fold in the Profits of her Milk, which will riſe in proportion to the Care that is taken to feed her well juſt at this Time.

When ſhe has calv'd let her be kept that Day and Night in the Houſe, and let the Water be a little warm'd that ſhe drinks. She is to be turn'd out the next Day, in the Heat of the Sun if well; but ſhe ſhould be taken in at Nights for two or three Days following, and ſome Water a little warm'd ſhould be given her before ſhe is turn'd out in the Morning.

In hard Weather in the Winter, Cows that give a good deal of Milk, ſhould be fed in proportion; and that ſhould be fine Hay every Morning and Evening, when the Ground is cover'd with Snow; and at other Times once a Day, as there may be found Occaſion.

When a Cow does not yield Milk enough at theſe Seaſons, to pay the Price of a good feeding with Hay, let the Fodder be Hay and Straw mix'd; or if ſtill worſe, let it be Straw alone. But then it muſt be Oat Straw, for Barley Straw has a particular Effect in drying up a Cow's Milk; and if given to her in this Condition, becauſe the Quantity ſhe yielded would not pay for better Fodder, the Conſequence would be that ſhe would yield none after a very few Days feeding.

When the Farmer has a Scarcity of Hay, or the Price is very high, let him give the Cows which he deſires to keep in Milk, Malt Duſt, ſcalded with boiling Water. The Malt Duſt ſwells up vaſtly with the Water; and when it has ſtood to be almoſt cold, it is to be given the Cow in the Manner of a Maſh.

If the Cow have this at Times, ſhe may be fed with any Kind of Straw; for this breeds Milk ſo well, that the other Food will not be able to dry it up while the Creature has the Advantage of its Aſſiſtance at the ſame Time.

About LONDON they feed their Cows very much with Grains. This is a Diet that cauſes them to yield a vaſt deal of Milk; but it gives it an ill Taſte; and is unhealthful for the Cow, ſubjecting her to many Diſorders. The Malt Duſt is as cheap, and anſwers the ſame Purpoſe in a much ſmaller Quantity, and without the Danger of Illneſs, or hurting the Milk. It may be bought at Three-pence a Buſhel, and it ſwells ſo much in the wetting, that this Quantity will very well laſt a Cow a Week.

In FEBRUARY, when the Paſturage is eaten bare, the Cows are to be taken up into the Cow-houſe, and fed with dry Meat, according to their Quantity of Milk; thoſe which yield the moſt being the beſt fed to keep them to it; and the others in proportion.

Milch Cows ſhould not be blooded unleſs there be preſſing Occaſions, and in that Caſe the Quantity ſhould be moderate, never more than about ſixteen Ounces.

The Difference there is between one Cow and another, in the Quantity of their Milk, is ſo great, that there can no exact Rule be laid down for their Management in Times when feeding comes dear; the beſt that can be ſaid is, that in proportion to the Profit the Creature brings, ſhould be allowed an Expence in feeding: for a Cow may be kept alive, in Health, nay and in tolerable Fleſh, for much leſs than ſhe can be fed for the continuing to yield her Quantity of Milk.

The Demand there is for the Milk and the Cow, and the Profit that may be at any time made by ſelling both, is to be conſider'd; for the ſame Thing is worth much more in one Place, and at one Time, than another, in proportion to theſe Accidents.

In the Neighbourhood of LONDON there is ſo conſtant and certain a Demand for every thing, that the Cow Keeper, partly with his early and late rank Graſs, partly with Hay, and partly with Turneps and Grains, feeds his Cows in ſuch a Manner, that they are at the ſame Time in their higheſt Perfection for Milk, and at any Time fit for the Butcher. But this is not to be done elſe-where.

The Difference between the Milk of theſe Cows however, and thoſe fed in the Country, is very great, and all the Advantage is on the Country fed Cows Side. The Grains make the Milk poor, though they yield a large Quantity.

The Price of grazing Ground about LONDON is very great indeed, but this is very well anſwer'd in the preſent Article, by the Price at which the Milk is ſold. This poor Milk being ſold at Three-half-pence the Quart, very bad Meaſure, while in the Country, but half a Day's Journey from LONDON, 'tis a Penny the WINCHESTER Quart; and in ſome Places the Milk Quart is full three Wine Pints, while the LONDON Quart of Milk is much leſs than a Wine Quart.

A Cow in a good farming Country, where Proviſions are at a middling Price, is ſuppos'd, while in Milk, to be worth five Pounds a Year. This is reckoning her to yield about four hundred Gallons in that Time, which, with proper Management is a very decent Computation.

If the whole Quantity of Milk yielded by a middling Cow, be made into Butter, the Quantity will be about two hundred Weight a Year; and there will be a Value beſide in the ſkim'd Milk Cheeſe, and in the Whey, which laſt ſerves for the feeding of Hogs. From this, which is counting at a moderate Rate, we may ſee the Importance of this Creature to the Farmer, eſpecially if he take Care to keep her in tolerable Fleſh all the Time, ſo that upon a ſhort Notice for fattening, ſhe may be ready for the Butcher.

There is another Uſe to which the Milch Cow is put in ſome Places, and which ſhould be here brought to Account, that is, the ſuckling of Calves. A good Cow will ſuckle four Calves beſides her own, and Grains will then be a conſiderable Article in her Food, for a great Part of the Year. In this Way of feeding, though the Milk be poor, there is always a great deal of it; and then, though bad for the Uſes of the Dairy, it is very fit for the breeding up of Calves.

In IRELAND they compute a Cow yields for

the firſt ninety Days three Gallons of Milk a Day; then for ninety Days more that ſhe yields one Gallon a Day; for ninety more about a Quart a Day, after which ſhe is to be allow'd about ninety Days more dry.

This is the Account of a poorer Kind of Cow than ours, and in generally poorer Paſture, and at more indifferent Feeding: but then the Price is leſs originally, and the Rent of Land leſs: ſo that all Things conſider'd together, the Profit may be about equal.

This may be ſet down as the pooreſt Account, for no Huſbandman ever needs compute lower than this, and the LONDON Account as the higheſt; and conſidering all Things, the Difference does not amount to ſo much, nearly as would appear at firſt Sight. The Huſbandman in general may reckon at a Medium between them.

But there are yet ſome other Articles which demand the Farmer's Conſideration. We have hitherto conſider'd the Cow as feeding only upon natural Graſſes in our Paſtures; but the Cuſtom is become very general of raiſing artificial Graſſes, and is very beneficial: and among other Uſes of theſe, Cows muſt ſometimes be fed upon them.

Now it muſt be allowed that theſe artificial Graſſes, as they are called, although they feed the Beaſt very finely, and occaſion a great deal of Milk, yet give it an ill Flavour, which runs through all the Things that can be made of it, and conſequently reduces their Price at Market.

For this Reaſon it is not adviſeable to feed the milch Cow upon theſe artificial Graſſes, when there is other Food ready for her. The Huſbandman ſhould never do this upon Choice; but he may often be led to do it by Neceſſity, and by the Circumſtances and Situation of his Farm. Now in this Caſe let him uſe his Cows not for the immediate Sale of Milk, or for the Dairy; but for the ſuckling of Calves. Upon a very moderate Computation a Cow that ſuckles four Calves, beſide her own, in one Year, will be worth five Pound to the Farmer; which is much the ſame with her common Produce, any other Way; and if ſhe ſhould be able to ſuckle five, the Gain would be advanced five and twenty per Cent. She is much more likely to ſuckle five upon this Feed of artificial Graſs, than any other Way; for it keeps her in Heart, as well as cauſing Abundance of Milk: and in this Caſe the ill Taſte the Milk gets is no Diſadvantage: for the Calves ſhew no Averſion to it; nor is it at all taſted in the Veal.

For the ſame Reaſon that ſuckling is the beſt Uſe for Cows under this Circumſtance of feeding on artificial Graſs, it is alſo adviſeable to prefer it to all others, when the Farmer's Paſtures where his Cows feed, happen to abound in ſuch natural Graſs as gives a Rankneſs to the Milk. This is often the Caſe, where the Graſs is large and ruſhy, or of that jointed Sort common in marſhy Places. This Kind of Food yields a great deal of Milk, but with an ill Flavour, but the Calves have no Diſlike to it, nor does it do any Harm to their Fleſh, either in Taſte or Colour.

I have ſaid little of Cheeſe in the Conſideration of the Uſes of the Milch Cow; becauſe there are ſome Grounds where it cannot be made to any great Account, of which more in its Place. In general, in thoſe Counties where good Cheeſe is not to be made, it ſhould be entirely let alone: in others the Profits, upon a fair Account, conſidering every Article, ſeem to be about equal to thoſe reſulting from Butter.

The Dairy requires the niceſt as well as the richeſt Milk; and therefore, where the Circumſtances will not allow of the Cow's yielding this, her Milk ſhould be always put to other Uſes. The fine Milk is the Produce of ſweet Graſs and good Water. Where the Food is rank, or the Water bad, the Milk will always have a Taſte from it; and for that Reaſon, if the Paſture be ever ſo good, and the Water bad, it is beſt for that only Reaſon to ſet aſide all other Thoughts, and uſe the Cows for ſuckling of Calves, if the Circumſtances and Situation render that a practicable Matter.

About LONDON, where the Cow is kept in Fleſh all the Time of her Milk, ſo that ſhe is any Day of ready Sale to the Butcher; the Way is as ſoon as ſhe begins to fail in Milk to ſell her, and purchaſe a lean Cow in the proper milch Condition in her Place.

In the Country ſomething like this is to be done alſo, tho' more Care and Time is requir'd for it.

One of the greateſt Inconveniencies of ſucking theſe Calves is, that they keep the Cow down by the Quantity of Milk they draw, ſo that ſhe is not ready to go to the Bull again at a proper Seaſon, but miſſes her Time. When this happens, the Farmer's Buſineſs is to fatten her up for the Butcher.

About the Beginning of MAY, or in the Middle of AUGUST, ſuch Cows are to be turn'd into a proper Paſture for fattening, and manag'd accordingly. This will take up four or five Months, and at the End of that Time they will be of ready Sale; and if theſe Seaſons are obſerv'd for turning them in to fatten, they will be fit for Slaughter at a Time when they bear a Price; for thoſe which are turn'd in at the firſt named Seaſon, are fit to kill in Harveſt Time; and the others a little after CHRISTMAS.

Both theſe are Seaſons when Beef bears a Price; and the Price for which ſuch a fatted Cow is ſold, will be enough to purchaſe a milch Cow with a Calf by her Side, and pay for the Time of her fattening into the Bargain. Thus the Huſbandman muſt contrive and compute, for all Things muſt be taken into his Conſideration, if he would make the moſt of his Profeſſion. It is eaſy to get ſomething by it; but he who ſets to work upon it with Knowledge, will double his Advantage.

CHAP. XIV.

Of the Calf.

WE have already given the Huſbandman proper Directions for the Choice of his Bull, and his Cow, therefore he is ſo far inſtructed toward the breeding of the Calf. But a great deal remains to be ſaid reſpecting its Ma-

nagement, for it may, in many Caſes, be made doubly valuable by proper Care. In different Counties various Methods are uſed in raiſing of Calves, according to the Nature of the Demand for them; many Means being employ'd to ſuit their Fleſh to the Taſte and Eye in the Markets, of which we ſhall treat hereafter. There are two Ways of breeding thoſe which the Huſbandman intends to rear. The one is to let them run with the Dam all the Year; and the other is, that of taking them from the Cow when they have ſucked a Fortnight.

In the cheap breeding Counties, the firſt Way is the moſt uſual; and it is commonly allow'd that it produces the faireſt, ſtouteſt and beſt Cattle. It is done alſo with leaſt Trouble to the Owner. Theſe are Inducements of ſome Conſequence, but there are in many Inſtances others on the oppoſite Side that out-weigh them.

When the Calf is taken from its Dam at a Fortnight old, a great deal of Care is requir'd in raiſing it: but in thoſe Places where it is the common Method, all this becomes familiar and eaſy by Uſe. They firſt of all warm a Quantity of ſlet Milk, and teach them with a great deal of Pains to drink it. There is a great Caution to be uſed in the Degree of Heat they give this. It is moſt natural when it is of the ſame Heat with the Milk juſt drawn from the Cow; and if it be much warmer, or much cooler than this, it is ſure to do the Calf Harm, and often is its Deſtruction.

The Calf, if rightly manag'd, in a little Time gets ſome Strength and Hardyneſs, but when juſt weaned, and at this tender Age, it is very weak and tender.

When thus wean'd, it is to have Milk given to it for a Quarter of a Year; and at the End of that Time, in order to break it from that, ſome Water is to be put to the Milk, and by Degrees more and more till it be only Water, and ſerve for Drink, not for the ſole Nouriſhment.

Before it is brought to this, the Calf muſt be taught to eat dry Food, which is to be done by putting ſome fine Hay in a cleft Stick, and leaving it in his Reach. This ſhould be firſt put in his Way when he is about five Weeks old; and he will ſoon take to it; ſo that by the Time it is proper to wean him from Milk, he will naturally feed on Hay.

When the Calves have got ſome Strength and Hardyneſs, the Huſbandman is to take his Opportunity in fair Weather, in the Middle of the Day, to turn them out to Graſs; they are to be taken in at Night for about a Week, and ſome Milk and Water given them warm; and it is a good Cuſtom to ſet a little to them ſometimes in a Pail in the Field: this may be done occaſionally, till they are able to feed and take Care of themſelves.

Great Caution is to be uſed in the firſt turning Calves out to Graſs, not only that it be a favourable Seaſon, but a proper Kind of Paſture. It ſhould have a ſhort ſweet Graſs, with a good Body, but no Rankneſs.

The beſt Way is to wean the Calves at Graſs, for when they are wean'd in the Houſe by means of Hay and Water, they generally become ſubject to Diſorders. The other is the moſt natural Method, and every Way the beſt.

At about three Years old, ſuch of the Male Calves as are intended for Oxen, ſhould be gelt. This is the Time at which they ſuffer leaſt from it.

In Places where there is a quick Demand, the beſt Method is to fat all the Calves for the Butcher, except ſuch as ſhall be neceſſary to keep up the Stock. This Demand is commonly largeſt near great Towns, where the Price of the Calf is high, and where the Grounds are not profitable to breed upon, ſo that it is a particular Circumſtance: cheaper Countries being fitter for breeding.

As the Price of the Calf in theſe Places depends upon the Fatneſs and the Colour of the Fleſh, the great Care of the Owner is to be turn'd to theſe two Articles: in the which if he ſucceed perfectly, his Calf will fetch as large a Price as a good Heifer. In order to make the Calf fatten, and have a white Fleſh, the common Method is this. They keep them extreamly clean, giving them freſh Litter every Day, ſpreading the new upon the old; and always keeping a Couple of large Lumps of Chalk hung up in Corners of the Coop, in their Reach; and where they cannot foul it by treading upon it, or by their Dung or Urine.

The Calf will be continually licking theſe Chalk Stones, and their Whiteneſs communicates itſelf to the Fleſh throughout his whole Body.

Another Care is, the proper building of the Coops in which Calves are to be fatten'd: the two great Conſiderations in theſe are, the keeping them cool and dry. For the firſt Purpoſe they build them in Places where there is little Sun; and for the other, they raiſe them three Foot from the Ground, ſo that the Urine and all other Moiſture naturally runs out.

When the Calf is in this keeping, well fed, and carefully look'd after in every Reſpect, it is twice at leaſt blooded: once of theſe Times is at about five Weeks old, and the other Time a little before it is killed.

When a Calf purges, the Cuſtom is not to let it ſuck altogether, for the Milk of the Dam often throws it into this Diſorder, which certainly waſtes its Fleſh. In this Caſe they give it Milk with Chalk ſcraped into it, which has a double Effect; ſtopping the purging, and throwing more of the whitening Matter into the Fleſh. They ſcrape the Chalk very fine for this Purpoſe, and after mixing it well with the Milk, they pour it down the Calf's Throat with a Horn.

Often it happens that this will not remedy the Diſorder, and the Calf is like to be ſpoiled. In this Caſe they uſe the Cold Bath for it; and give it ſome Bole Armenick, and Chalk mix'd up with Milk into Balls.

If this does not anſwer, they know not what to do farther. But I have found that in the worſt Purgings to which theſe young Creatures are ſubject, a ſmall Doſe of Diaſcordium made without Honey, mix'd with Port Wine and Water made warm, and given with a Horn, will do more good than all their Remedies.

The

The Calf muſt not have any Milk for three Quarters of an Hour before, nor an Hour after this Drench, but it may lick as much Chalk as it pleaſes. If this does not anſwer in the firſt Doſe, another may be given twelve Hours afterwards, and this rarely fails. The Quantity to be given each Time is a Dram. This never hurts the Colour or Taſte of the Fleſh.

This Purging is the moſt common Diſorder the Calf falls into, but it may be diſordered in the other Extream, and that is full as bad. If it be coſtive, the Fleſh of it will never be delicate. When any Tendency to this is obſerved, the proper Method is to give a little Manna; and the beſt Way of giving it is this: buy about an Ounce of ordinary Manna, which they ſell at a ſmall Price at every Druggiſts; diſſolve it in a quarter of a Pint of Water, and add a Spoonfull of Brandy. Thicken up this Liquor with fine Wheat Flower, and make it into Crams, give the Calf three or four of theſe every Morning after he has been ſucking, and dip them in Milk to make them go down. Repeat this till the Calf is right in this great Reſpect; and then leave it off.

Theſe, as they are properly ſpeaking, Medicines for the remedying of Diſorders, might have been reſerved to their Places in this Work, in a ſucceeding Book, but as they immediately concern the Management of the Calf for Slaughter, I have ſet them down in this Place, not wiling to give the Reader the Trouble of a needleſs Reference to another Part.

The Manner of bleeding Calves is this. The firſt Time it ſhould be done in the Neck, and Care muſt be taken not to draw too much. The ſecond Time it is beſt done by cutting off a Piece of the Tail, and if this do not bleed ſo much as might be expected, it may be repeated at two or three Day's Diſtance, by cutting off another Piece, which will bleed juſt as the former.

One very uſeful Effect the Chalk given to Calves has, beſide the whitening, which is, preſerving the Fleſh, for it keeps it dryer than it would otherwiſe be, and the Wetneſs is what makes it ſo ſoon taint.

The Cow is ſubject to great Irregularity in breeding of her young. Very frequently there are Parts of a ſecond Calf growing out of the firſt; and theſe monſtrous Productions are ſhewn about for their Curioſity.

Nature often is ſo abundant in this Species, that the Young come by Twins: and we have Inſtances of Cows that have, for ſeveral Years together, always brought forth two Calves at a Time, as if it were the natural Condition of the Animal. Dr. PLOT, in his natural Hiſtory of STAFFORDSHIRE, tells us of a Cow at DUNSTALL, in that County, that for three ſucceſſive Times brought forth two Calves each Time, and a third Time three. Thus having no leſs than nine Calves in three Years Time.

The Bull was doubtleſs the ſame to this Cow, and to many others, which we do not find recorded upon this Account, as having brought forth their Young in any particular Manner; whence we may naturally infer, that in the Caſe of Twins in our own Species, as well as other Animals, the Cauſe of them is in the Female more than the Male.

One would not build ſuch a Suppoſition upon a ſingle Inſtance, but the ſame Author tells us of another Cow that had ſucceſſively three, two, two, and then three again, ſo bringing ten Calves in the ſame Space of Time as the other nine: and it appears from Obſervation, in almoſt all theſe Inſtances, that the Creature who thus brings an abundant Number of young at any one Time, continues to do it.

MORETON, who in his Hiſtory of NORTHAMPTONSHIRE, mentions Inſtances of a like Kind, adds, that when the Twins are one Male, and the other Female, the Cow Calf, if it be brought up, is always barren. In that, and in ſome of the adjoining Counties, they ſhew a Kind of Cows which they call Free Martins, they have large Horns like an Ox, and they ſay they partake of both Sexes. Theſe are ſaid to be the Cow Calves where there have been Twins. And they add, that when the Twins are both Female, they are prolifick like other Creatures of the ſame Species.

I have ſet down theſe Articles which are Matters of Curioſity, merely for the ſake of farther Enquiry. Theſe Writers are too apt to take Things upon Report, and we know how idle many of the Stories are, which are confidently and univerſally propagated among the Farmers in moſt Countries; and believ'd by the Vulgar, becauſe they often hear them.

CHAP. XV.

Of Sheep, and the ſeveral Breeds in this Country.

NEXT in Value and Conſideration to the larger of the Horned Cattle comes the Sheep; an Article of vaſt Concernment to the Farmer: cheap in the Purchaſe; eaſily fed; and returning a great Profit by many ſeveral Ways: even its Dung upon the Land often paying for all it eats while fed upon it.

We have already adviſed the Farmer in the Choice of his larger Cattle, to proportion their Kind to the Degree of Richneſs in his Land: it is not the Fortune of every Huſbandman to labour upon a fruitful Soil: but the worſt is not without its Uſes; and Sheep are a Stock for ſuch as will not ſupport the larger Kinds. We ſee them thrive upon the moſt barren Downs; and the Farmer will always find them ready to fatten upon ſuch Grounds as will not keep the other Kinds alive.

As the Oxen of ENGLAND are of very different Breeds, though all the ſame in Kind, ſo it is with the Sheep, which differ extreamly according to the ſeveral Breeds in different Places; and are therefore ſuited one to one Kind of Land, and another to another.

We ſhall adviſe the Huſbandman to great Caution, in the ſtocking his Farm with Sheep: and this under two Heads, firſt, with Reſpect to the Breed, and ſecondly, for his Choice of the Creatures themſelves; for there are, in every Breed, many that are much finer than others,

and theſe he ſhould chuſe. Half the Profit that might be made by this Part of the Huſbandman's Stock, is loſt by Careleſſneſs in the firſt Choice, and in the following Management: but an Error in the firſt Choice is the moſt fatal, becauſe it is irrecoverable, except by beginning over again. We ſhall therefore firſt conſider that, and laying before the practical Huſbandman the Properties and particular Uſes of the ſeveral different Breed of Sheep that we have in England, ſhall adviſe him in his Choice according to his main Deſign, his beſt Advantage, and the Nature of the Land he has to ſtock with them.

With reſpect to the Fineneſs of the Wool, there is a ſmall Breed, diſtinguiſhed by their black Face and thin Coat, that exceed all others. They bear but a ſmall Quantity in Compariſon of many, but the Quality of it makes Amends. Theſe are eaſily known by Sight. They were firſt rais'd in Herefordshire and Worcestershire. And for that Reaſon are known in many Places by the Name of the Herefordshire or the Worcestershire Breed. A dry, barren, and expoſed Paſturage will very well feed this Kind, for they are hardy; and the ſhorter the Graſs on which they feed, it is obſerv'd the finer the Wool. They are alſo excellent for the Table, the Joints being ſmall and full of a fine Gravy. We ſee this Kind kept in many Parts of England, in Gentlemen's Parks and Lawns, and they every where make a pretty Appearance.

The Kind moſt oppoſite to theſe are a large, tall, and heavy-loaded Sheep: theſe have ſtrong Limbs, and a ſtout Gait in walking: they carry a great deal of Wool, but it is coarſe. Theſe were firſt bred in Lincolnshire, and in ſome of the adjoining Counties; and are fond of living in Salt Marſhes. They have been taken into many Parts of the Kingdom, to other Ground, where they do not keep entirely to their own Nature: and yet are called from the Place whence they were brought, the Lincolnshire Breed.

The Fleſh of theſe is large grain'd, but moderately taſted, and no where very much eſteem'd. However, as they are obſerved to ſucceed better than the other Breeds, in Places toward the Sea, it may be proper for the Huſbandman who has Land in ſuch a Situation, to take ſome of them: though not for his whole Stock in this Kind.

Thirdly, there is a Breed between theſe two Kinds, which in general ſhould be prefer'd to either. This is a large, tall, and ſtrong Sheep, of the beſt Shape of any, and having the deepeſt Coat of Wool. This was originally fed in ſeveral of our midland Counties, and has thence been called by ſome the Midland Breed; and by others, from ſome particular Counties famous for them, the Leicestershire or Northamptonshire Breed. The Wool of this Kind, though not altogether ſo good as that of the ſmall black faced Sheep, is greatly preferable to that of the Lincolnshire Breed; and the Quantity is ſo much greater than that of the ſmaller Kind, that it very well makes amends for its inferior Quality.

The Fleſh of this Sheep is the common Mutton, not in any thing particular for Goodneſs or Badneſs: and it will do very well upon the common Paſture Grounds, and thrive upon every common Kind of Food. For theſe Reaſons it is fit that theſe Sheep ſhould be moſt generally bred.

When the Huſbandman has very poor Paſture Grounds, let him take the Herefordshire Breed; and when he borders upon the Sea-Coaſt, or upon the Shores of large Salt Water Rivers, let him prefer, in Part at leaſt, the Lincolnshire Kind: but when he has none of theſe particular Reaſons to byaſs him, let him prefer this midland Breed to any other.

To theſe three, which may be call'd the general Breeds of Sheep, I ſhall add a few Words on two other Kinds.

The Sheep bred in the Northern Parts of this Kingdom, are a large and big bon'd Sort; they approach to the Lincolnshire Kind in Shape; but their Wool is harſh, rough, and hairy, theſe are called by ſome the Yorkshire Breed.

Their Fleſh is inferior to that of ſeveral other Kinds, as well as their Wool; but they have an Advantage over the others, in that they will ſtand the coldeſt Weather, and take Care of themſelves where ſome of the tenderer Breeds would be loſt. This may recommend them to the Huſbandman whoſe Lot has thrown him far North, where the other Kinds will not thrive; but he ſhould not introduce them into his Farm in any other Situation, for they are leſs profitable than any others.

The laſt Kind, or Breed, to be mentioned, is in a Manner peculiar to mountainous Countries; and is moſt frequent in Wales. It may therefore be called the Welch Breed. This is a ſmall, but well-ſhaped Sheep; and ſo hardy that it will live any where. The Fleſh is excellent for the Table. But the Wool is not only ſmall in Quantity, but is the worſt produced by any Breed of Sheep in this Country.

The Huſbandman will ſee by this Account, that it never can be his Intereſt to admit this Breed among his Stock, unleſs compelled to it by the Particularity of his Situation. The little black fac'd Sheep of Herefordshire has the ſame Advantage in the Excellence of its Fleſh; and it has, into the Bargain, the fineſt Wool in the World. Therefore it is highly to be prefer'd, where it will thrive: and it will do on very poor and very expoſed Ground. However, if at any time the Farmer finds his Paſtures ſo poor, ſo expoſed, and miſerable, that they will not ſupport this Kind, all he has to do is to call in the other, or Welch Breed, which will live any where.

CHAP. XVI.

Of the Choice of Sheep.

HAVING laid before the Huſbandman this Account of the three principal different Breeds of Sheep in England, and the two other Kinds that are, in a Manner, particular to certain Places, the next Part of our Care muſt be, the inſtructing him in his Choice, not only of the Breed he ſhall fix upon, for the Grounds of that Choice have been laid down already, in their ſeveral Characters; but of the particular Creatures

he ſhall fix upon in the Breed that is moſt ſuited to his Purpoſe.

But to this Particular let us premiſe a few Words upon his general Choice, that is, as to the Breed. He ſees here five ſeveral Kinds of Sheep, ſome large, others ſmaller; and ſome yielding a greater, ſome a ſmaller Quantity of Wool, which is alſo on one Breed fine, and on another coarſer. He has his Choice given him among all theſe, for we ſuppoſe him not yet to have begun ſtocking his Farm with this Article: it would be natural for him to prefer at once the fineſt Kind as moſt profitable; but let him not only remember, but ſtrictly obſerve what we have juſt laid down, that every Breed will not ſuit every Paſture.

He has now ſeen what are the Kinds of Sheep: let him examine what is the Nature of his Land; and when he has impartially conſider'd this, let him fix upon that Breed which will thrive beſt on that Kind of Paſturage he has at his Command, for this we have expreſly told him with reſpect to each; and let him then purchaſe for his Farm that Breed which he ſees will be moſt ſuited to thrive on it.

This he may be aſſur'd of, and he may extend the Rule farther than barely to his Sheep, that he will have more Profit from the very worſt Kind that ſhall thrive upon his Land, than he poſſibly can from the very beſt that ſhall ſtarve upon it.

One Thing farther is to be noted before we come to the particular Choice, that is, the Difference of the Land which he is to bring them to from that whence he purchaſed them: this muſt be in this Reſpect, as has already been caution'd upon other Articles, always in Favour of the Land to which they are brought; for any Breed whatever will decline upon being brought from a richer Paſturage to a poor one.

Let the Farmer therefore ſee that he buy not only a kind ſuited to his Grounds; but that he buy them from a worſe Land than his own, becauſe upon that will depend their immediate thriving.

Having thus ſettled the general Points, let him proceed to the Care he is to uſe in the Choice of each particular Sheep.

Whatever Breed they are of, let him obſerve that what he purchaſes are ſtout, hearty, well made, and big boned: let him ſee that the Wool of whatever Kind or Depth, be ſoft to the Touch, and ſeem fatty in the handling; and that it be clean and well curled.

Sheep of this Condition, whatever Breed they belong to, always bear the largeſt Quantity of Wool according to their Kind: and theſe are Marks alſo that make them bring a Price at Market. The Butcher has his Rules for judging as regular as the beſt Farmer, and theſe are the Things after which he principally enquires to ſettle the Creatures Value.

In the laſt Place, we are to give Directions for the Choice of Sheep to breed. This is a very material Article, and muſt be well regarded. Let the Farmer chuſe his Ram by theſe Marks; let him be young, handſome, and well ſhap'd, of whatever Breed, ſee that his Wool be clean and grow well; and let the Skin underneath be of the ſame Colour. Let his Body be large and long; his Forehead broad, round and riſing. Let his Eyes be large and of a cheerful Aſpect, and his Noſtrils ſtrait and ſhort.

The Sheep without Horns, which are called the polled Breed, are accounted the beſt Breeders; this is eſtabliſh'd upon ſo long and repeated an Experience, that the Farmer needs not doubt it.

In the Choice of the Ewe for breed, let her Neck be large and upright, naturally bending like the Neck of a Horſe. Her Back ſhould be broad, and her Buttocks round: her Tail ſhould be thick, her Legs ſmall and ſhort; and her Wool ſhould be thick and deep, and ſhould cover her every where.

Of all Things let the Purchaſer take Care that they be ſound, and, to know that, let him examine whether any of the Wool be wanting: let him ſee that the Gums be red, and the Teeth white, the Felt looſe, but the Wool firm, the Breath ſweet, and the Feet not hot.

With reſpect to the Age, two Years old is the beſt Time to have them at. They will bear good Lambs till they are ſeven Years old: and their Age is to be known by their Mouth. When they are one ſhear they have two broad Teeth before; when two ſhear, they have four; when three ſhear, they have ſix; and when four, they have eight: after this their Mouth generally begins to break.

By this the Purchaſer will be able to gueſs at the Age of his Sheep; and, as to their Condition, nothing ſhews it more than the Dullneſs of their Eyes, and the Looſeneſs of their Wool. If theſe Marks be upon them, let not the Farmer purchaſe them by any Means, for they will never ſtand.

CHAP. XVII.

Of the breeding of Sheep.

THE Rams and the Ewes being choſen for breeding according to the foregoing Directions, the Huſbandman is next to conſider what will be the beſt Time for putting them together. In this, as in other Reſpects, let it not appear that I lay more upon his Mind than I need. It is true that a great deal more Care is here recommended, than uſually is taken by Country People on moſt Occaſions; but not more than is proper or requiſite. The Principle on which I have ſet out in this Treatiſe is, that the Huſbandman by Induſtry and Knowledge of his Buſineſs, may obtain much larger Profits than the common Run of Perſons in this Buſineſs are content with; therefore although leſs Care and leſs Foreſight than is here recommended may do; yet he who uſes the moſt will have the largeſt Gains. I expect my Farmer in every Article of his Buſineſs, to conſider the Event before he fixes upon the Means; and always to have the End in his Eyes when he is about to make a Beginning.

Thus in the preſent Inſtance, before he puts his Rams and his Ewes together for breeding, I adviſe him to compute the Time of their going

ing with young, and ſo to know when his Lambs will be brought forth. When he has computed this, let him ſee whether it will be a convenient Seaſon for him; and which will be beſt. Let him conſider at what Time of the Spring his Graſs will be fit to maintain the Ewes and their Lambs, and then put the Rams and their Females together ſo long before, that will bring the young out at a proper Time.

Let him conſider whether if they fall early he ſhall have Turneps to ſupport them till the Graſs comes: for I have often ſeen very great Miſtakes in this Reckoning: and many a Time the Huſbandman, for want of due Care in this Reſpect, has loſt both his Ewes and his Lambs for want of due Food.

The prudent and conſiderate Farmer is to take Care before he puts his Sheep for breeding, he is ſure not only of a Support for the young and their Dams when requir'd; but that it be a ſufficient and good Food for them. That which will keep them alive oftentimes, will not be ſufficient for their thriving. There muſt be Plenty of what is good in its Kind, for if there be a Defect in either Quantity or Quality, the Lambs will be ſtunted at firſt, and this is an Accident they very difficultly recover afterwards.

The Time of the Ewes going with Lamb is twenty Weeks, and the beſt Seaſon of the Year for them to yean is, toward the Middle of APRIL; except where there is very forward Graſs or Turneps. But if on any Occaſion from the Circumſtances of the Farm, or any particular Conſideration, it is neceſſary to have them yean much earlier, they may be put together ſo as to come in JANUARY or FEBRUARY.

In this Caſe there will require a great deal of Care to be taken of the Lambs for ſome Time. All Lambs are very tender when firſt brought forth, and if they are not tended, the Magpyes, and other Birds will peck their Eyes out: but the Coldneſs of the Seaſon keeps ſuch as fall in JANUARY or FEBRUARY tender and weak much longer than thoſe which are brought forth at a more advanced Time in the Spring; and therefore a nicer Care is requir'd to breed them up; and it muſt be continued a longer Time than on the other Occaſion.

As to the Land to breed Sheep upon, when the Farmer has Variety, and can take his Choice, let him obſerve theſe ſeveral Qualities in the different Kinds, and conduct himſelf accordingly. A rich Paſture breeds well ſhap'd and tall Sheep, according to their Kinds; and ſuch as have a ſhort Graſs breed a lower but well ſet Sheep. Thoſe which are bred in mountainous or woody Places, are commonly ſmall limb'd and low.

In general, dry Paſtures are the fitteſt for this Purpoſe: all wet Grounds, and ſuch as are liable to be overflow'd, being hurtful; excepting only the Salt Marſhes, which, for the proper Kinds, ſucceed very well.

The Farmer ſhould keep all this in Mind, but at the ſame Time remember, that theſe Rules are ſubordinate to thoſe more general ones, which have been deliver'd already. The Breed of his Sheep is the great Article of Conſideration in reſpect of their Size, and he has already been inform'd what Breeds ſuit what Lands: thoſe more eſſential Conſiderations being kept in Mind, theſe leſſer ones are of great Uſe.

Let the Farmer who is about breeding of Lambs, ſave the Graſs and Weeds that grow in the Lands he deſigns to fallow in Winter, that is, from CHRISTMAS; and let him turn his Ewes and Lambs into them in MARCH. If there be a mild Winter, this will be a great Help to them.

When Sheep are to be turn'd into Wheat or Rye to feed, the Farmer muſt take Care it be not too rank before they are put into it, for in that Caſe it gives them Purgings, and other Complaints.

No Cattle whatſoever ſhould be fatted while they are going with young, for nothing is more dangerous to them: they ſhould therefore be kept upon a moderate, or rather poor Paſture all the Time they run breeding, except the three laſt Weeks. This is a Rule to be more carefully obſerv'd with Sheep than any other. If they be fed too high the whole Time, it will go hard with them in yeaning; but if they are not put a little into Heart before they come to it, they will want Strength; and they will alſo want Milk for the Support of the Lamb.

The proper Time of weaning a Lamb is at four Months old: but in general there need no Care or Caution to be uſed at all. In moſt Places where Things are properly manag'd, Nature does this, and the Owner knows nothing of it: in ſome Paſtures it is alſo the Preſervation of the Lamb to keep ſucking.

When the Farmer has Plenty of good Graſs, and his Rams always run with the Ewes, he need not give himſelf any Trouble about the weaning of the Lambs. The Ewe will in this Caſe go to Ram at a proper Time of her own Accord; and ſhe will then become dry, and the Lamb will be wean'd naturally.

In ſuch Paſtures as are ſubject to give Sheep the Rot at certain Times, it is always beſt to let the Lambs run by the Ewe; the longer the better. Theſe tender Creatures are more ready to come to harm than the full-grown ones in thoſe unſound Places: and ſucking is the beſt Preſervative againſt it: for they are ſeldom found to fall into that Misfortune while they have Milk.

If the Farmer have ſuſpicious Paſtures, and finds that his Lambs want Milk, it is beſt to ſell them at once to the Butcher: for it is not the running by the Ewe that will preſerve them, ſhe can be of no Service againſt ſuch an Accident, if ſhe wants Milk for their full Support.

Thoſe he Lambs that are intended to be bred as Rams, ſhould be ſeparated from the reſt, and the others gelt in Time. The ſooner this is done the better: for every Creature bears this Operation beſt while it is tender, and is with the Dam.

If this Operation have been neglected at a proper Time, it muſt be done toward the End of SEPTEMBER, at which Seaſon it is beſt to ſeparate the Breed for this Purpoſe, and ſee it be done perfectly.

CHAP.

CHAP. XVIII.

Of the ſheering of Sheep.

WE come now to a very conſiderable Article in the Value of Sheep, that is the Wool; and this, like every other Part of the Huſbandman's Profits, may be enlarg'd greatly by due Care and Management.

There are two Articles in the Condition of the Wool which enhance its Price. Theſe are Fattyneſs and Cleanneſs. And it is in the Owner's Power to give it theſe in a much greater Degree than they otherwiſe would be, by his Care and Attention. The firſt will be increaſed by the Time of ſhearing the other by Cleanlyneſs.

The Fattyneſs of the Wool will never give it any Value, unleſs it be at the ſame Time clean; and the Cleanneſs will diſcover its Imperfection, inſtead of enhancing the Price, if it be not fatty.

This Fattyneſs of the Wool is owing to the Creatures ſweating, and therefore there muſt be ſome hot Weather paſt before it is ſhear'd, that it may have ſweated well: not once or twice, for that will anſwer no Purpoſe: but ſeveral Times for Days together, that the Moiſture may have lodg'd itſelf about the Wool, and in a Manner oiled it ſo, that the neceſſary waſhing of the Creature for Cleanlyneſs, ſhall not be able to carry it off.

Unleſs the Sheep have ſweated well before the Waſhing, that will do harm equal to its good, for as much as it increaſes the Price by Cleanneſs, it diminiſhes it by taking off the Fatneſs. It is very neceſſary Sheep ſhould be well waſh'd before they are ſheer'd: but the Farmer is to know at the ſame Time, that unleſs they have well ſweat in their Wool firſt, this will hurt it.

Upon this Foundation depends all the Art of Sheep-ſhearing. The beſt Seaſon of the Year for doing it is toward Midſummer. But let the Weather determine, and let not the Farmer be carried away by the Name of any Day, or Month, againſt the Uſe of his Reaſon.

June has been commonly made the Month for Sheep-ſhearing; for this plain Reaſon, that at this Time of the Year there commonly has been ſome hot Weather to ſweat the Sheep; and there follows hot Weather after it. But as this is the Reaſon why June is proper, if any Year the Seaſon prove very cold in the firſt Part of Summer, let him defer it till July; and, on the other hand, if very hot Weather come in early, let him go to ſhearing in the End of May.

In general, if the End of May be hot, he is to begin early in June; and if the hot Weather have not come in till the Beginning or Middle of June, he is not to ſhear his Sheep till the latter End of that Month. And in this Manner let him who would ſucceed well in the Huſbandman's Buſineſs, conduct himſelf in every Article. Let him know the Practice of others according to the common Rules: but let him examine the Reaſon of it in every Article; and while others follow it blindly, let him pay his Submiſſion to it with Diſcretion. I would not have him ſet himſelf up as an Oppoſer of the common Methods, unleſs where they are palpably wrong; but underſtanding their Origin and Foundation, he will often find it convenient to depart a little from them; and will always find the Advantage of that Liberty when it is founded upon Reaſon.

When the Huſbandman has on theſe Principles ſettled the Time of ſheering his Sheep for that Year, whether it be the End of May, the Beginning, Middle, or End of June, or the firſt Week in July: for it ought not to be later than that for many Reaſons; the next Care is to prepare for it by ſettling the Time of waſhing them, and giving them Opportunity to dry themſelves clean.

For this Purpoſe the Place of waſhing is to be fix'd upon, and a Piece of clean and dry Ground in which they are to run till they be dry'd, and where they can't get freſh Dirt. For Convenience Sake this Piece of Ground, and the waſhing Place, ſhould be as near one another as may be. So if the Farmer have his Choice of two or three ſuch Places, let him prefer that which is neareſt the Water; and if he have but one, and have good Convenience of Water, then let him make the waſhing Place in the Spot neareſt of all to this Ground.

Though it is very needful that the Sheep be waſh'd before it be ſhorn; yet it muſt not be ſhorn while it is wet: and if ſuffer'd to run at random afterwards, the waſhing would not be of much Effect.

The whole Matter, which is very plain and eaſy, being thus underſtood, and all Things ready, let the Farmer proceed to the firſt Article, the waſhing of his Sheep. Let him ſee that this be done thoroughly and carefully. There is a way of ſlighting Buſineſs in ſuch a Manner, that it might as well have been let alone; and this is too common in the Article of waſhing of Sheep, which is a Thing very troubleſome to do well; and that eaſily hides Faults, for if the Farmer does not ſee that it be done well while they are about it, he will not be able eaſily to know afterwards, whether it be well done or no.

The Preſence of a Maſter is always uſeful while Servants are employ'd for him; but in no Article more than this, for Cleanlyneſs will add conſiderably to the Price his Wool ſhall fetch.

When every Sheep has been thus carefully, thoroughly, and well waſh'd, let them be all turn'd together into the Piece of Ground deſign'd for their Reception, and there be left to run till they are dry. This, according to the Weather, will take two, three or four Days, rarely more, for the Seaſon is ſeldom very unfavourable at that Seaſon of the Year.

All Things being now ready, let the Shearer get to work, and 'tis worth the Farmer's while to take a great deal of Care to have one who underſtands his Buſineſs: for an ignorant or careleſs Fellow at this Work, may do his Maſter more

more Damage in one Day, than a Month's extraordinary Wages.

In this let him over-ſee every thing with his own Eye, as in the waſhing; and if he perceive any Sheep half waſh'd when it comes to the Hands of the Shearer, let him ſend it to be waſh'd over again.

Let the Farmer order his Shearer to be careful not to hurt the Sheep, and let him have his own Eye over him, that he do not cut them, or prick them with the Point of his Shears, for the Flies will immediately take Advantage of theſe Wounds, and torment the poor naked Creatures to Madneſs. Finally, let him ſee the Wool be carefully taken off, and well wound up.

It is a very good Cuſtom that ſome have, of ſhearing their Lambs together with the Sheep: although others very much condemn it. I would have the Farmer never fail to do this; but then he need not be very ſtrict and exact about it all over. The principal Care is to ſhear them well behind.

Before they come to be ſhorn it is very neceſſary to cut away the Wool of their Tails, and juſt behind, that the Dung may not hang on it, which makes the Creature ſore, and brings the Flies in the ſame Manner as a Wound with the Shears. When they come to be ſhorn they ſhould be cut cloſe behind; but very little before.

Sheep do much Damage to their Wool by lying in dirty Places, which they often will do, for they are not naturally a very cleanly Animal, as well as in their running in the Day Time. For this Reaſon the Wool of the ſame Breed of Sheep, is much finer in thoſe Counties where they houſe them in the Night, than in other Places. In Gloucestershire, and ſome of the adjoining Counties, they houſe the Sheep always at Nights, and litter them with clean Straw. The Expence of this is very well paid by their Dung, which, together with their Urine mixing among the Litter, enrich'd alſo by their Sweat, and the Fatneſs of the Wool, makes a very fine, rich, and pretious Manure.

We have treated largely of the Uſe of houſing Sheep, under the Article of their Dung, in its Place. The Method there preſcribed of throwing in ſandy or other Earths, to be enrich'd by the Dung and Urine of the Animal, is better than this of Straw, when the Article of Manure only is conſidered; but taking the Wool alſo into Conſideration, this by Straw is greatly preferable.

'Tis from the Conſideration of theſe ſeveral Methods, practiſed in different Places, and weighing the Advantages of each, that the judicious Huſbandman encreaſes his Knowledge; and his Profits will always be enlarged in proportion.

From what has been ſaid on theſe Heads ſeparately, and in their proper Places, he will now, ſumming up the whole together, be able to determine upon a Conduct in the Management of his Sheep, which although built upon the Practice of different Counties, in ſeparate Articles, is preferable, upon the whole, to any one of their Methods ſingly.

Thus if he uſe the cover'd Fold, for the Sake of raiſing a Quantity of Manure with Sand and other Ingredients, during the reſt of the Year, he will do well to throw in clean Straw, by way of Litter, for the four or five Weeks before their ſheering. This will give him a conſiderable Advantage as Manure, if not equal to what he gets the other Way, and what he loſes in that Reſpect, he will gain with Encreaſe by the Fineneſs of the Wool.

Upon this Principle alſo the Huſbandman may very reaſonably be directed to have a Kind of cover'd Fold, ever ſo ſlight, on the Ground where he turns in the Sheep, between the Time of waſhing and ſheering. Let him ſtrew this with clean Straw, by way of Litter; and ſee the Sheep all driven into it at Night. This they will very readily do, becauſe they will feel cold after their waſhing; and by this Means, lying clean and dry, they will keep the Wool very nice for the ſheering. Nay there is a Cleanlyneſs in the Nature of Straw that will be a great Advantage, for they will rub themſelves upon it to a clean bright Hue in the Wool, which it will not have any other Way.

CHAP. XIX.

Of the breeding up Houſe Lambs.

THE Price of Houſe Lamb, at early Seaſons, is ſo conſiderable, that it may be very well worth while for the Huſbandman who is ſituated near large Towns, or where there is a Demand for it, to raiſe ſome for this Purpoſe.

To this End three Things are principally to be conſidered. Firſt, to have a proper Kind of Sheep; ſecondly, to put the Rams and Ewes together at a right Seaſon, that the Lambs may fall early; and laſtly, to provide proper Pens in an Houſe for the receiving and nurſing up the Young: for their tender Bodies require a great deal of Care at ſuch unnatural and ſevere Seaſons.

There is a Kind of Sheep of the midland Breed, but a little ſmaller than what we commonly underſtand by that Name; otherwiſe very like thoſe of the Leicester and Northamptonshire Kinds; theſe are remarkable for their naturally lambing very early. If left to themſelves they will bring forth about the Middle or latter End of December; and therefore, if properly put together by the Huſbandman, who underſtanding the Benefit of early Lamb, and computing the Time, contrives accordingly, they will come ſomewhat earlier. Theſe Lambs brought forth in the dead of Winter, may be eaſily rear'd at Home, and will bring a Price that will very well anſwer the Trouble.

This particular Kind of Sheep is bred principally in Hampshire and Wiltshire; and is known among the common People by the Name of the Wey-hill Sheep.

The Huſbandman who will proceed upon proper Principles, is always to prepare in Time for every thing. When he finds from his Situation and Circumſtances, that he may have a Demand for Houſe Lamb, at a good Price; and that he has Conveniences for raiſing it, let him take his Opportunity to buy ſome of theſe Wey-hill Sheep at the beſt Market, and be particularly careful that they are, in every Reſpect, ſound and free

from Blemiſh; chuſing them ſeverally, the Rams and Ewes, according to the general Direction laid down here for that Purpoſe, which anſwers for one Kind of Sheep as well as another.

Being provided with a proper Number of theſe Sheep, let him not leave their Time of breeding to Chance, but keeping them ſeparate, till a proper Seaſon, then put them together, that they may copulate in ſuch Time as to bring forth their Lambs at the Seaſon he deſires.

After this no farther Care is neceſſary than that the Ewes are fed in a Paſture not too rich, for the greateſt Part of their Time; but about three Weeks before their lambing, they are to be brought into a richer Feeding; and as the Time of their bringing forth is very exactly known, let there be due Care taken of them, and of the Lambs as they fall, that neither are hurt by the Severity of the Seaſon.

The Sheep being thus carried on to their Time, and the Lambs brought forth, the laſt Care is the bringing them up for the Service of the Table; or, according to the Farmer's Reckoning, for the Purchaſe of the Butcher.

A great many Arts are uſed to this Purpoſe; and a great Number of different Directions have been given about it, by thoſe who have pretended to have great Knowledge; but the whole may be delivered in a few Words, and the Huſbandman who ſhall ſet about this, upon the Principles of good Senſe alone, will find that moſt of thoſe Cautions and curious Directions that have been ſo elaborately delivered, might have been ſpared.

The whole Care conſiſts in two Articles, the keeping the Lambs warm, and the feeding the Sheep in ſuch a Manner, that they may be able to ſupply them with a rich Milk, that will fatten them. There can be no great Difficulty, and certainly no Myſtery in this, ſo that it is idle to pretend to Secrets about it; and more idle in any to deter the Huſbandman from it, under Pretence of his not underſtanding how to do it. Let him ſet about it with theſe Precautions, and look to the Lambs himſelf with due Care, to ſee they are warm and clean; and feeding their Dams as he ought to do, he cannot fail.

The Severity of the Seaſon would deſtroy the Lambs, if they were left to ramble about with the Ewes; and the Scarcity of Food, at this Time of the Year, would make them unable to fatten them by their Milk, if they were not provided accordingly; but good Food will make rich Milk, and a due Portion of Food will yield it in due Quantity. This is all that is needful, and all this may be brought about in this eaſy Manner.

Sometime before the Ewes are expected to bring forth, let proper Pens be built up for them, in an Houſe that is warm, but not ſhut up cloſe, for if they have not Air they will not thrive with any Food.

As ſoon as they are brought forth let them be carefully put into theſe Pens, and from that Time watch'd and tended, that they may be always warm, dry, and clean.

We have already directed that the Ewes, toward the Time of their bringing forth, ſhould be put into a richer Paſture than that they had run in before: this will provide them a Stock of good Milk, and now they have lamb'd, this is to be enlarged and enriched, by giving ſtill better Food.

The beſt Food for this Purpoſe is Turneps; but where they are not in Readineſs, the Ewe, beſide her rich Paſture, muſt have, at Times, Hay, Bran, and Oats given her.

It is fit the Huſbandman ſhould know what to do, in Caſe of a Deficiency of what is proper, but theſe other Supplies do not enrich the Milk in the Manner of Turneps; therefore he who proceeds upon our prudential and careful Principles, muſt not fail to have Turneps for the Occaſion.

The Ewes are to be brought into the Houſe three or four Times every Day, to ſuckle the Lambs; and in this Manner, as thoſe young Creatures are kept very cleanly and comfortably, and feed to their Fill upon rich Milk, and upon nothing elſe; they will fatten quickly, and their Fleſh will naturally be exceedingly white and delicate.

The whole Art of this profitable Part of the Huſbandman's Buſineſs, is compriſed in theſe few Articles. The Ewes being well fed, have plenty of rich Milk, and the Lambs ſucking to their Fill, and being kept quiet, fatten upon it freely. As to the Difference of Seaſon they feel nothing of it; for ſo they be kept warm, it matters not to them whether it come from the Sun, or from their comfortable Shelter.

Having mentioned, in its Place, the folding of Sheep for the Benefit of Land, ariſing from their Dung, we ſhall here add one Caution on that Head, reſpecting the Creature itſelf, and then cloſe this Article.

The Advantage the Land receives from the folding of Sheep is very obvious; but let the Huſbandman take Care that he does not loſe more by the Damage he does his Sheep by this Practice, than he gets by the enriching ſo much of his Land.

There is nothing that tends more to give Sheep the Rot, than this Method of folding them, when due Care is not taken in the doing it.

The Sheep are to be put into theſe Folds at Night, in Summer, but let the Huſbandman take Care only to do it in good Weather; otherwiſe it may coſt him very dear. Let him ſee that they are not turned out in the Morning, till the Sun has been ſome time up; and let him take Care they are driven to a good feeding Place, for otherwiſe, being hungry, they eat any thing: and thus, between cold Nights and bad Food, they get the Rot and periſh.

CHAP. XX.

Of Hogs, their Advantages and Evils.

A GREAT Recommendation of any Animal to the Farmer, is the Cheapneſs of its Food, and this ſets the Hog above almoſt any other in his Eſteem; little is to be bought for that Creature, and he conſumes very little of the Stock of whatever Kind, any thing contenting him that is eatable, though his Appetite is greater than that of any of the Kinds yet mentioned.

If Food is to be raiſed for the Hog, it comes very eaſy; Coleworts, French Beans, and any other of the coarſer Vegetables anſwer the Purpoſe, they grow any where, and are ſown with little Trouble; and the worſt of theſe will fatten the Hog; in which Condition he ſupplies the Family and the Market, to a very good Account.

The Fleſh ſerves the Farmer in a Variety of Forms, and when the more marketable Parts are diſpoſed of, there remains a great deal that anſwers that Purpoſe.

The Refuſe of every Thing ſerves them for Food, as whatever is thrown from the Barn, the Kitchen, or the Dairy. If they be ſuffer'd to run free about, they will, in a great Meaſure provide for themſelves, but this is not a profitable Method, although it may appear a ſaving one. My Huſbandman doubtleſs is acquainted with that good old Obſervation, that all that is ſaved is not got, and it will ſerve for his Inſtruction here; for while they get their Food for nothing by running abroad, they waſte their Fleſh; ſo that what is loſt in their Value, is much more than is gain'd by the ſaving.

Having named the good Qualities of the Hog, it is proper to mention alſo the bad: the Farmer who is about to buy in his Stock, ſhould know at once the Advantages and Diſadvantages attending every Kind, that he may purchaſe accordingly. The Hog is the moſt ravenous of all the Creatures commonly kept about Houſes. They ſpoil and deſtroy more than they eat, if they are not kept in due Bounds, and with a proper Care; and their rooting up the Ground is a very troubleſome and miſchievous Quality. No Creature is more apt to break the Farmers Fences than the Hog; and between this and his tearing up the Ground, and trampling Things to Pieces, the Miſchief he would do if left at large would be endleſs, and all his Value would not pay for it.

Theſe are his ill Qualities, they are therefore to be guarded againſt; and in Proportion as the Farmer is in Danger of being more hurt by them, and has it leſs in his Power to prevent them by a proper Manner of keeping the Creature, by ſo much the more cautious ought he to be in the buying any large Number of this Animal.

The Ways to prevent theſe Accidents, are by managing, or keeping the Hog up. We have ſaid before that in running at large the Hog waſtes his Fleſh, therefore it is always beſt to keep them penn'd up into ſome Court. This is the moſt beneficial not only with Reſpect to their Fleſh, and its Profits, but to the Dung they make in theſe Places, for whatever is thrown to them, that they do not eat, they here trample to Pieces, and being mix'd with their Dung and Urine, it becomes excellent as Manure.

In Places where it is not convenient to keep them thus enclos'd, their rooting up the Ground is prevented by putting Rings into their Noſes; and their breaking Fences in ſome Degree by their being yoak'd.

Theſe are the Remedies for the Evils attending the keeping of Hogs; and the Huſbandman who has already ſeen their good and ill Qualities, will judge upon this according to the Circumſtances of his Farm, whether it be convenient for him to engage in the feeding many of them or not.

CHAP. XXI.

Of the ſeveral Breeds or Kinds of Hogs.

IF upon mature Conſideration any one determines to keep Swine in large Numbers, and with Expectation of a conſiderable Profit, let him firſt be very careful in chuſing his Kind. There are not ſo many diſtinct Breeds in Swine, as there are in Sheep and Oxen, but there is a great deal of Difference between thoſe there are.

The Breeds may be diſtinguiſh'd into three, 1. The wild Hog, which is ſmall, but hardy: it will feed upon leſs than any other, and its Meat, though ſmaller in Quantity, is preferable to that of any other. 2. The common Hog which is larger, longer leg'd, and bigger bon'd than the wild, and affords an excellent Bacon: and, 3. The low big belly'd Hog, which is of late become very common in moſt Parts of England. This lives cheap, is leſs miſchievous than the others, and breeds very faſt. But it is inferior to the common Swine in its Advantages to the Farmer, all Things being conſider'd together.

Of theſe ſeveral Kinds the low Hog is to be choſen by thoſe who live in and about large Towns, to run about the Streets, where it takes Care of itſelf, and does better, being of a quieter Diſpoſition than the others: the Farmer in the Country is to chuſe the common Hog as beſt ſuited to his Purpoſe, being the largeſt in its Growth, bringing forth a ſufficient Number at a Litter, and being eaſily fatted for the Service of his Family, or for the Market.

In ſome particular Counties theſe Creatures thrive better than in others, particularly in Hampshire, Leicestershire and Warwickshire. It will be therefore prudent, if it can be done with Convenience, to buy the Hogs for breed from theſe Places; and let the Purchaſer be very particular on this Occaſion in reſpect of their Shape.

Let them be choſen with long and large Bodies, deep Sides and Bellies, and very thick Thighs; let the Neck be thick, the Noſe ſhort, and the Chine thick and well ſet with large and ſtrong Briſtles.

When the Farmer has taken Care about a proper Kind of Hog for ſtocking his Yard, and underſtands thus how to chuſe them, let him next be careful in ſuiting the Number to the Bigneſs of his Yard, and to the Quantity of the Proviſion he will be able to ſupply them. And in this the Care is, that he do not take in too many; for no Creature breeds faſter than the Hog, and if he does not uſe Moderation in ſetting out, he will be over-run with them.

This great Increaſe depends partly upon the Number the Sow brings forth at a Litter, and partly from the Shortneſs of the Time ſhe goes with young. One of theſe Creatures will have four

four Litters in a Year, and they will bring from eight to twenty at a Time. So large a Number as the laſt is not common, nor indeed is it natural, for the Creature can bring up no more than ſhe has Teats to ſuckle.

When a Sow brings forth more than ſhe can raiſe, they muſt be put to other Sows, if there be any in the Yard in a proper Condition to ſuckle them; if not, they muſt be deſtroy'd, for there is no raiſing them.

The more Hogs there are in the Yard, the more ravenous they are, for they grow greedy by obſerving the eating of one another; and if there be not ſufficient Food for them at the Time when they give ſuck eſpecially, they will eat up one anothers young, or their own; ſo that of all Creatures in the Stock, the greateſt Care is to be taken with regard to theſe, that more are not taken in than can be fed.

Let the Farmer chuſe out the largeſt and ſtouteſt of his Pigs for the continuing of the Breed; and one Rule of judging early of their Qualities in this Reſpect, is the obſerving which they are that ſuck the foremoſt Teats; for they all aim at this, and the ſtrongeſt get them.

After the proper Number of the beſt and ſtrongeſt Pigs are thus choſen out to be rear'd as Boars and Sows for Breeding, ſuch as are not diſpoſed of while Pigs for the Spit, are to be gelt or ſpay'd according to their Sex. This prodigiouſly increaſes their Fat, eſpecially that of the Females.

Great Quantities of Hogs are rais'd at this Time by the Brewers and Malt Diſtillers, becauſe of the Convenience of their Grains; but of this more need not be ſaid here, the Method being known and eaſy, and at this Time deliver'd down among the Rudiments of thoſe Profeſſions to ſuch as learn them. They are kept clean and well fed, and nothing more is requir'd to their perfect thriving.

There are two different Ways of managing the Fleſh of the Hog for Service; the one for Pork, and the other for Bacon. According to the Choice of theſe, the Age of the Creature is to be different. About nine Months old is the proper Age of the Hog for killing for Pork, and the fineſt Time for Bacon is when they are a Year and half.

As to the Time of their Breeding, the ſtouteſt and beſt Pigs are to be had from Sows of three, four, or five Years old, but they will begin to breed at a Year old, and will very well continue till they are ſeven: the three Years I have nam'd are however the prime. The Age of the Boar is to be conſider'd by thoſe who would keep up a good Breed, as well as that of the Sow, he ſhould not be leſs than two Years old, nor more than five.

The Boar is no Loſs at the End of this Time, he may be ſold for Brawn, if an Opportunity offers; if not, he may be gelt, and will fatten very well: nor does the Operation, though perform'd ſo late, do him any Harm.

A great deal of Prudence is requir'd in the Management of this Creature. An Error any Way in reſpect to their Food, is very prejudicial; for the general Courſe of their Lives it matters not much what it is, but due Care muſt be had about the Quantity. If they are allowed too little, they will be continually ravenous and miſchievous, and if they are fed too plentifully, they will not be healthful. They ſhould be kept in Heart and Strength by moderate feeding, till the Time they are to be fatten'd up for killing; and on this Article depends in every Reſpect, a great Part of the Profit that ſhall ariſe from them to the Owner.

CHAP. XXII.

Of the feeding of Hogs.

AS to the Manner of feeding Hogs, the beſt Method is to keep them for the moſt part in the Yard: their Food there ſhould be Waſh every Morning and Evening; ſuch as Diſh-water with Grounds of Drink, and a few Grains or other Offal: for the reſt of the Day they may be occaſionally ſuffer'd to graze, eſpecially in damp ſedgy Grounds, and the Refuſe of the Garden is to be thrown to them in the Yard. Such of this as they do not eat, they will tread to Pieces, and with their Dung and Urine it will become excellent Manure.

Hogs feed excellently in Woods, and under Hedges in Autumn, when the wild Fruits are ripe and falling, they eat every Kind; Hips, Haws, Sloes, Acorns and Beechmaſt, and theſe are a very natural and excellent Food for them. If Hogs could be fed thus conſtantly, their Fleſh would be ſweeter and better taſted than it is in the common Way of fattening of them; but in ſome Places there is but little of this Food; then it falls out only at one Seaſon of the Year, and the Creature is not well to be truſted. When all Things concur, the Fleſh of a Hog thus fed is excellent: ſome think this Food alone will not give the requir'd Firmneſs to the Fat, but Experience ſhews they are miſtaken.

When Hogs are to be fatted in the Stye, Cleanlyneſs is a very great Article. They muſt alſo be fed often, and not too much ſet before them at a Time, for their ravenous Appetites will lead them to eat more than they can digeſt. Their Food muſt be freſh and good; they muſt have as much freſh and ſweet Water as they chuſe to drink; and be kept quiet. In this Manner they will fatten ſoon and well. Their Fat will be firm, and their Fleſh well taſted.

Nothing anſwers ſo well in all Reſpects for the fattening of Hogs as the Fruit of the wild Trees; they have Air and Exerciſe while they get it; and they live clean; and it is their natural Food: theſe are great Reaſons, but where there is not a Convenience of getting this Food, or the Seaſon of the Year does not ſuit, the Way is to fatten them up altogether in Styes, and this is to be done with Peaſe; or when they happen to be dear, the Meal of offal Corn will anſwer the Purpoſe: theſe are to be mix'd up with Whey or ſkim Milk, or Milk and Water, and the Creature will never fail to fatten upon any of them.

It will take about a Month to fatten a Hog in this Way, ſuppoſing him to have been in that midling

midling Condition before, which we have recommended for the Sake of his Health. Peaſe, when they are to be had, are to be prefer'd to the other Foods; and there is ſuch an Opinion of their Effect in giving Firmneſs, and a clean Taſte to the Fat of the Bacon; that in Places, or at Times when they happen to be dear, although the Hog be fatted up with the other Things, they generally give him a good Quantity of Peaſe the laſt Week.

Hogs will ravenouſly eat the Buds of many Trees, particularly the Aſh and Sycamore, and it is a Practice in ſome Places to beat down Sycamore Leaves for their Food, upon which they will fatten.

Grains fatten them very quickly, and often when theſe Creatures will not thrive with any other Food, theſe will bring them to themſelves, and they will afterwards fatten upon any Thing.

The Way in which Hogs are fatted in many Places, for the Service of the Navy, is excellent; and when there are Conveniencies for it, ſhould be follow'd by every Farmer who deals in theſe Creatures. They take in a Piece of Ground by the Side of a running Water, hedging in alſo ſome Part of the Water that there may be a Place for the Hogs to drink without Danger of their Eſcape. They ſtack up a Quantity of Beans and Peaſe in this incloſed Piece of Ground, and turn in as many Hogs as the Quantity of Food will fatten. They let them here live at their Eaſe and Liberty one among another, cutting down the Stacks as they are wanted. Thus having Plenty of Food and Water, and Room and Quiet, they fatten excellently.

As the Hog is a Creature often apt to waſte its Food if too much be given at a Time, they have a very good Contrivance in ſome Parts of OXFORDSHIRE to prevent this, and at the ſame Time to ſave the Trouble of that conſtant Attendance, which is requir'd in feeding them with ſmall Quantities at a Time. They do it in this Manner. They place over the Stye a Veſſel like the Hopper of a Mill, and into this put as much Beans or Peaſe, or other dry Food, as will fatten ſuch a Number of Hogs. From this there comes a large ſquare Pipe down half Way of the Stye, thro' which the Food continually deſcends out of the Hopper. This Pipe terminates at that Diſtance in ſix ſmaller Pipes, each of which ends in a ſmall Trough, that is no bigger than juſt to admit the Noſe of the Hog; and they come all of them with their Ends ſo near the Bottom, that there is never above a Handful of the Food at a Time in each Trough. When this is taken away by the eating of the Hog, there follows ſo much more. This prevents their waſting any Part of the Meat, at the ſame Time that they have a conſtant Supply: and if it happen from the Convenience of the Place, that a ſmall Current of Water can be brought through the Stye, they will in this Manner be fatted with leſs Trouble, than in the Way already mention'd of ſtacking the Beans and Peaſe for their Service.

The Inconvenience from Hogs rooting up the Ground, has been mention'd already; and the common Method of preventing it, which is by putting a Ring in their Noſe; but as this is often ineffectual, and a great deal of Miſchief is ſometimes done very unexpectedly by theſe Creatures, we ſhall propoſe, to the Imitation of the Farmer in general, a Method much more ſecure, which has been long practiſed in STAFFORDSHIRE, and ſome of the neighbouring Counties, although it has not got into Uſe in all Parts of the Kingdom.

Inſtead of the Ring they uſe a forked Iron, arm'd at each Point with a Fin like the half of an Arrow Head. This being thruſt through the Edge of the Hog's Noſe, cannot be got back, and they cap the Bottom or ſquare Part of the Fork that lies upon the Noſe with a long and hollow Ring, which turns round upon it. So that the Creature can never take hold enough to turn up the Earth. This is a Contrivance very eaſy, and it ſhews its own Uſe. The Damage Hogs often do by rooting up the Ground is ſufficiently known; and many have found how unfit the common Method by Rings is to prevent it. This will never fail perfectly to anſwer its Intent; and ought therefore to be univerſal.

The Method of feeding Hogs on Clover has been mention'd occaſionally in another Place, when we were ſpeaking of the Dung of that Animal as a Manure; and ſomething farther may be properly added here. Clover is an excellent Food for the Hog, but it is beſt not to make it the only Food, for it is apt to give a Yellowneſs to the Fleſh, which hurts it in the Market. The beſt Method of giving Hogs Clover is, at the ſame Time that they are feeding at other Hours of the Day on other Things. Thus let them be turn'd out of the Stye without their Breakfaſt of Waſh in the Morning, that they may have a good Stomach for the Clover; and at the right Seaſon be driven into the Field with the Horn'd Cattle. At Evening let them be brought home, and fed with Waſh mix'd with Grains or Corn, or let them have inſtead of the Waſh, a great deal of ſkim Milk or Whey. This is the Manner in which Hogs may be fed to the greateſt Advantage upon Clover: and it is a very good Method of managing them.

Bran and Pollard fatten Hogs very ſpeedily, but the Fleſh is not ſo firm: nothing for this Purpoſe anſwers like the Pea or Bean; a great Variety of Foods might be mention'd for a Creature that will eat any Thing, but there are none of them come up to theſe, which are natural to the Animal.

The Diſtillers Waſh and Grains feed them up quickly, but there is a great Difference between the Bacon and Pork fatted by that Means, and ſuch as is fed on the natural Fruits of Trees or Pulſe, ſuch as have been before recommended.

The ſame Kind of Food is alſo excellent, given properly, and in due Quantity for the feeding of Pigs at their firſt weaning, the beſt Food is ſkim Milk, Whey, and the artificial Graſſes. After a Week or ten Days, it will be proper to add Bran or Grains to the Whey or Milk; and ſoon after this they may have Peaſe and Beans in Moderation, and this will increaſe their Growth, and make their Fleſh better. After this, if they have been pig'd in an early Seaſon,

they

they will come in for a Share of the Stubbling and Beechmaſt which will at once raiſe them beyond Expectation.

A great deal of Advantage in this Reſpect is owing to the Seaſon of their being pig'd; the Spring, or early in Summer, is the beſt Time for thoſe that are intended to be brought up; thoſe that are farrow'd near Winter, if ever ſo much Care is taken of them, growing ſlowly they are often ſtunted in their Growth; and they are always more ſubject to Diſeaſes than thoſe which come at a more favourable Time.

CHAP. XXIII.

Of Goats.

THE Goat is not to be ſet upon an Equality with the Sheep or Swine, in its Value in any Reſpect; but there is an Advantage attending it which none of the others have, and which ought to recommend it to the Conſideration of all who are ſituated ſo as to enjoy its Benefit; this is, that it will live where neither Ox, Sheep, or even Hog can. In ſuch Places it does not ſtand in Competition with thoſe ſeveral Kinds, for they cannot be fed there; but for this very Reaſon, the Goat ſhould be bred in thoſe Places, for the Profit of this Creature is ſomething; and it is in that Caſe the only Kind that can be had.

The Goat will feed in common Paſtures, but there it is not worth while to breed or ſuffer them, for Sheep of one Kind or other will live on them according to their Natures; and the very worſt Kind of thoſe are greatly preferable to the Goat in Profit. Beſide, the Goat is more apt to crop the young Shoots of Trees and Shrubs than any other Animal whatſoever, and in this Reſpect alone, would do more Miſchief than he was worth.

Theſe are ſufficient Reaſons againſt breeding this Creature in common Grounds, but where there is hilly, barren and uſeleſs Land in any Quantity, there 'tis every one's Intereſt to breed this Creature, for it will walk at its Eaſe where any other Animal would break its Neck, and will feed very well where any other Kind would ſtarve.

The natural Soil and Situation for the Goat is a barren, rocky, and craggy Mountain. Theſe Places, even the worſt of them, produce ſome Briars, and other ſmall Shrubs, and upon the Shoots of theſe the Goats browſe with the greateſt Satisfaction imaginable.

In general the Food of Goats is ſuch, as is of no Uſe to any other Creature; and they are to be bred with very little Care or Trouble. For theſe Reaſons I would adviſe every Huſbandman who has in his Poſſeſſion this barren, buſhy, and rocky high Ground, to keep them: and for his Inſtruction to make the greateſt Profit by them, I ſhall lay down ſome Obſervations which I have received from a very worthy Correſpondent upon the Borders of WALES, where there are a great Quantity of them kept to conſiderable Profit.

There is leſs Difference in Goats then among moſt other Kinds, yet for the Farmer who intends to bring them to a new Place, the following Conſiderations ſhould be obſerved in the Choice.

The beſt Goats are thoſe which are ſtrongeſt limb'd, and largeſt bodied, therefore let them be choſen for Breed, big made in every Part, and cover'd with a deep and ſtiff Hair. Let their Joints be firm and ſtrait, the Neck ſhort and thick, and the Head ſmall and ſlender, with full and large Eyes, and long and ſtout Horns. The Colour is not material, nor certain, but in general the black Goat is the ſtouteſt, and his long Beard is a Sign of a good Kind; the py'd Goats are ſuppoſed to bring forth the fineſt and beſt taſted Kids, but this is not certain or unalterable.

The Goats being thus choſen, the next Care is the putting them together for Breed. No Creature is ſo ready for copulating. The Seaſon when the young will be beſt bred up, is ſuch as comes from their being put together toward the Middle of Winter. This is the Time at which the Huſbandman who intends to raiſe a good Breed, ſhould put them to one another; and to this Purpoſe the he Goat ſhould be from two to five Years old: he is beſt if about three or four; and the ſhe four, five or ſix. This is the Time of Life at which they are found to breed the beſt and ſtouteſt young ones, for the he Goat wears himſelf out by his frequent Copulation, and is enfeebled by Age at ſix Years old; after which Time his Young are poor, and ſeldom come to any Thing.

The ſhe Goat is ſeldom troubled with Diſtempers, and is a very free Breeder; they will very well bring forth twice a Year, and they have ſometimes two, and ſometimes three Kids at once.

The Goats ſhould be kept in Herds or ſmall Flocks; and though they are very hardy, yet it will be a great Advantage to them if they have Shade in Summer, and Shelter in Winter. But this laſt muſt not be carried too far; if they be houſed in the hardeſt Time of the Winter, as is done in ſome Places, they ſhould have no Litter; for that will make them too hot: they are uſed to Hardſhips in their natural Way of living, and nothing is ſo likely to do them Miſchief as too much Care and Tenderneſs. Cleanlyneſs is a great Article when they are houſed, for as they are uſed to ſweet Air, and are in themſelves very rank; if they are kept hot and frowzy, they fall into Diſorders.

Nothing will require a ſtricter Care in the Farmer's Hands who breeds Goats, than the defending his Trees from them, for they will certainly deſtroy the young and new planted ones; and the oldeſt will not eſcape.

It is enough for the Defence of Trees againſt other Animals, to train them up ſo that the Branches ſhall be above their Reach from the Ground, but this is no Defence againſt the Goat; for that Creature will climb the old Trees, particularly the Elm, of whoſe young Shoots it is very fond, and will browze for Days together among the young Branches.

For this Reaſon as the barren and rocky Grounds before mention'd, are fit Places for them, they ſhould be confined to theſe alone.

Otherwiſe they will ſoon do more Miſchief than they are worth. This keeping them in due Bounds however, is not difficult; and there are a great many Places in England, where a very conſiderable Profit might be made by breeding them.

The Advantages the Huſbandman receives from the Goat are of four Kinds. The Milk, the Fleſh of the Kid, the Skin, and the Hair: but of theſe the two latter are leſs regarded.

The Hair is, in ſome Places, us'd for twiſting into Ropes, and has this Preference above all other Kinds, that it will never rot in Water. In ſome Places alſo Goat's Hair is wrought into a Kind of Cloth for Apparel.

The Skin is capable of being dreſs'd into a very good Kind of Leather; and it is uſed for this Purpoſe in ſome Places, though altogether neglected in others. Goats Milk is of the Nature of Aſſes Milk, an excellent Reſtorative in Conſumptions, and for decayed Conſtitutions; and in ſome Counties they make a very good Kind of Cheeſe from it: in other Places, where the Stock conſiſts partly of Goats, and partly of Cows, the latter of which the Huſbandman cannot keep either of a very good Kind, or in any great Number, becauſe of the Barrenneſs of his Land, they mix the Goats Milk and Cows Milk together, and this Way it yields a very good Kind of Cheeſe, and that in a large Quantity, according to the common Way of making. This is the Practice I ſhould adviſe to the Farmer who keeps Goats: for there is ſcarce any Place where he may not upon the better Pieces of his Ground, keep ſome Cows, and the Goat's Milk anſwers much better, and is managed much more eaſily for Cheeſe in this Mixture, than when People are reduced to uſe it alone.

The Fleſh of the Goat is very rank, and even unwholeſome, as well as unpleaſant; but Kid is a fine Meat, it is very little inferior to Veniſon; and as the Kid is ſo eaſily had, and rear'd with ſo little Trouble, were there no other Reaſon for keeping of Goats, this were ſufficient. People that are delicate about the Fleſh, are at the Pains to rear Kids for the Table, in the ſame Manner as we have directed already for Lambs; but this is not worth while, for with the leaſt Care imaginable they grow to an excellent Condition, as they run wild after the Dam.

CHAP. XXIV.

Of the Rabbit in general.

THE Rabbit is a ſmall Animal, and may appear of ſmall Conſequence after the Kinds already named for the Farmer's Breeding, yet this is very well worth his regarding, as a Part of his Stock. It has the Recommendation of the Goat, that it will thrive where nothing elſe can live; and the ſame Advantage as the Hog, in the great Encreaſe by young.

Both the Buck and Doe Rabbit are eager for Copulation, and they muſt not be reſtrain'd. The Does go but a Month with young; and as ſoon as they have brought forth, they are ready to copulate again. When they run wild they get together in a very little Time; and when they are kept tame and ſeparate, they muſt be put together ſoon after the bringing forth, otherwiſe the Doe grows ſullen, and will take little or no Care of her young ones.

The Rabbit is diſtinguiſhed into two Kinds, the wild and the tame. Theſe are kept in a diſtinct Manner; the wild running looſe, and burrowing themſelves Holes in the Ground, and the tame being kept in Houſes, Huts, or Boxes.

Both Kinds yield a very large Profit, though under different Management. The wild Rabbit breeds faſtly and freely in Warrens, or other Places where there is Room and a free Air. They will thrive upon the pooreſt and barreneſt, gravelly, ſtony, or ſandy Soils; by ſtony we mean ſuch as are full of ſmall Stones, not the rocky, for in theſe laſt they cannot burrow. In theſe Sort of Grounds the Farmer will find great Advantage from the breeding of Rabbits, either altogether or occaſionally: for in the latter Way they improve theſe barren Lands extreamly, by their Dung and Urine, and render the worſt of them fit for raiſing good Crops of Rye; and ſuch as are but a little better, for the other Kinds of Corn.

The Diſtinction between wild and tame Rabbits is not founded in Nature, but on our own Practice; for the wild Kinds may be as well kept tame as the others. They are uſed to a Kind of Impriſonment in their Holes, and for that Reaſon they bear Confinement better than moſt other Creatures.

CHAP. XXV.

Of the Wild Rabbit.

AS to the wild Kind there is properly but one Breed of them, and all the Direction that is needful in the Choice is, that ſuch as are taken to begin a Stock, be large and big bodied, with a good deep Fur that hangs faſt upon their Backs, and with ſtout Limbs. The Huſbandman that has waſte Ground in his Hands, that is fenced well, and not with live Hedges, ſhould never omit this Part of his Stock, for the very worſt of his Ground will do, and the Advantage he receives from them will be very great.

A ſmall Number is ſufficient to be firſt turn'd in, for of all Creatures uſeful to Mankind, they are the greateſt Breeders.

Experience ſhews that the wild Rabbit ſucceeds better in ſome Places than others; the young growing up much quicker, and the Fleſh being finer and better taſted. The Reaſon of this is to be ſearch'd in the Soil and the Produce; and this may teach the Huſbandman on which of ſuch Grounds as ſeem proper, it will be moſt to his Benefit to breed them.

In general, the ſhorter and ſcantyer the Graſs, the better is the Taſte of the Rabbit. The dryer the Ground the better they ſucceed, where there is much Water they never are well flavour'd.

Of all Creatures, Water is the leaſt neceſſary to the Rabbit, for we ſee the tame ones will live very well altogether without it, on moiſt Food.

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Where the Soil is dryeſt, the Air fineſt, and the Water that there is in the Way is running and clear, there the Rabbits may reaſonably be expected to ſucceed beſt. Damp Ground, and ſtanding Waters being the greateſt Diſadvantages to this Creature.

As I have obſerved that the common wild Rabbit will very freely be kept tame; ſo it has been found, many Years ſince, that thoſe which we uſually underſtand as tame Rabbits, will live very well wild, eſpecially the hardier Kinds. This is a Conſideration of ſome Conſequence, becauſe there is one of the tame Kinds that is, in every Reſpect, better than the common wild one. This is that which is known by the Name of the Silver-hair'd Rabbit. It will live and thrive as well wild as the common Sort; and it is always better taſted and fairer to the Eye, ſo that it brings a larger Price. The Skin alſo is of much more Value, and the Demand for it among the Furriers is conſtant and certain.

For theſe Reaſons it is, in many Caſes, adviſeable to breed this Kind wild inſtead of the other: but though it often is ſo, it is not always. This, though as hardy as the other, requires a better Supply of Food, and is poor, and of little Value upon thoſe barren and heathy Lands, on which the common wild Rabbit ſucceeds very well.

The proper Place for this Kind is a Park, where it may run at Liberty among the Deer and other Cattle, and where there is good Graſs, though not rank, upon the Ground: the other is the proper Kind for the miſerableſt and pooreſt Lands.

CHAP. XXVI.

Of the tame Rabbit.

TAME Rabbits are diſtinguiſhed into ſeveral Kinds, according to their Colours and other accidental Diſtinctions; but the Differences are not great, nor is there any material Point of Profit attending the Choice of one or the other Sort.

The Silver-hair'd Rabbit laſt-named, is a very good and profitable Kind to be kept tame, becauſe of the Advantage of the Skin. The DUTCH Rabbit is a much larger Kind, and is very good for the Table, but the Skin is of leſs Value. The moſt beautiful, when kept cleanly, is the white long-hair'd Rabbit, this is, by ſome, called the TURKEY Rabbit, from the Place from whence we firſt had it; and by others the Shagge Rabbit, from the Length of its Hair. This is a very good Kind to breed tame alſo, but if not kept very clean, it is ſubject to a Diſorder not unlike what Doctors call the Plica Polonica; the Hair growing together in Clots and Cakes, and this often in ſuch a Manner, that Blood Veſſels from the Skin run up amongſt the Clots, and they will bleed on being cut off.

It is not very material which of theſe, or of the ſeveral other Kinds that it is a Cuſtom to breed at this Time, the Farmer chuſes; for, with proper Management, any of them will turn to very good Account; but which ever Sort it be, let him take a more ſtrict and critical Care in the Choice, than he has been directed to do in thoſe which are to run wild, for a great deal more depends upon it in this Kind, than in thoſe. The Skin here is of much Conſequence, and the Diſtinctions in this are nice, and never enough to be regarded in the Choice for Breed.

In the Silver-hair'd Rabbit for Inſtance, let the Huſbandman take Care to chuſe his Buck of the true Kind and Colour, for on this, more than on the Doe, will depend the Value of the Breed. Let the Fur be thick, deep, ſmooth, and gloſſy; and let the Ground Colour be black, with a moderate Quantity of white or ſilvery Hair. It is proper to chuſe them rather too dark, for breeding, becauſe the Colour in the young is more apt to grow paler than deeper; and a Silver Skin that is too dark, always will bring a better Price than one that is too light.

In the ſame Manner let the Fur of the ſeveral other Kinds be examined, when they are choſen for breeding; for the reſt of the Directions already given, for the Choice of the wild, hold good here: the largeſt and beſt ſhaped being to be fix'd upon. In the ſame Manner as theſe Rabbits were firſt choſen, let them be pick'd out from time to time for keeping to preſerve the Breed; for upon this will depend a great Part of the Advantage.

The Farmer having thus ſelected his Stock of theſe little Animals, is to take his Choice of the ſeveral Methods which are in Uſe for the breeding and keeping of them. Theſe are many, and among them ſome allow more and ſome leſs Liberty to the Animal: in general, ſuch as allow moſt Freedom, even in this Way, and moſt Air, are beſt, for though the Rabbit will bear Confinement very well, yet it will thrive beſt where that is leaſt ſtrict.

Cleanlyneſs alſo is a very great Article in the breeding of theſe, as well as other Creatures, and where the Confinement is leaſt ſtrict, there is naturally leaſt Foulneſs. The Dung and Urine of the Rabbit have a very diſagreeable and rank Smell; and nothing prejudices the Creature more than being kept naſty with theſe about it.

The general Way of keeping tame Rabbits is in a Kind of Boxes made for this Purpoſe: others keep them in Pits; but it would be a much better Way to keep them in Buildings made for that Purpoſe. This might be done at a ſmall Expence, and would anſwer very well: for it would be cleanlier and more wholeſome than any other Way. The Boxes are too ſmall, and therefore are apt to grow naſty, and the Pits are liable to be damp, which, as we have obſerved already, is one of the worſt Things that can happen in a Place where Rabbits are to breed.

The Boxes, for ſuch as prefer them, ſhould be made of thin Wainſcot, and divided into larger and ſmaller Rooms, two for each Rabbit. One of theſe ſhould be for eating, and the other for lodging and bringing forth the young. That for eating ſhould be the larger, and ſhould have a Grate before it for Light, and the ſmaller ſhould be entirely dark. Before both there muſt be plac'd a Trough, with the Food; and thus the Creature will live, thrive, breed, and fatten: but there wants free Air, and it is very difficult to keep

keep them cleanly, ſo that although this Method may do, the others are ſure to anſwer better, when they are managed properly.

Thoſe who uſe this Method by Boxes, ſet them one above another, in ſo many Stories; and keep the Bucks by themſelves, and the Does by themſelves; unleſs it be ſuch Does as have not bred; and with thoſe they lodge a Buck in the ſame Box. The common Size of theſe Boxes is two Foot long, the ſame in Breadth, and a Foot high. It is ſurprizing to ſee ſo large a Creature as a Rabbit live ſo well as it does in this ſmall Compaſs; but it will always do better when it has more Room.

The Method of keeping them in Pits is preferable, and is thus. A dry Soil is to be fix'd upon for this Purpoſe, and the Pit is to be dug ſeven Foot deep, and of a Bigneſs proportioned to the Number intended to be kept in it. This muſt be wall'd up on the Inſide, only leaving Spaces for them to make their Burrows. A ſandy Soil, not too deſtitute of other Earth, will anſwer for the Purpoſe of theſe Pits, better than any other. At one End an hollow Place is to be made for the Buck to reſt in, he muſt be chain'd to a Stump, and have Room only to go to the Rack where the Food is placed in theſe Pits, and thence to his Den to reſt. At the other Parts of the Pit, out of the Reach of the Buck, are to be the Places left for the Does to make their Stops or Burrows. The Rack is to be placed near the Middle of the Pit, between the Buck and Does, he being on one Side by himſelf, and they on the other.

Three Does may very well be kept in the ſame Pit with one Buck, and the Pit for this Purpoſe ſhould be about ten Foot ſquare. Some make them larger, and keep more Bucks than one, but it is a better Practice to make more of them, only allowing one Buck and two or three Does to each.

This will naturally appear to thoſe who are not acquainted with theſe Things, a large Proviſion for three or four Rabbits, and a great Expence for ſo few and ſmall Animals; but thoſe who have kept theſe Creatures know that it very well anſwers the Expence. Provided the Pit be dry they live more comfortably by much in it, than in the other Way of Boxes; and the Produce is ſo great that one Buck and three Does will bring a hundred and fifty, two hundred or more young ones in a Year.

The young are to be left under the Care of the Dam, till they are about a Month old, and they are then to be taken from her, either for Sale or the Table; or if there be no Demand either of theſe Ways for them, they muſt be put into ſome Pit, or other Place made for that Purpoſe.

The ſame Practice is to be obſerved in removing the young, if they are kept in Boxes, or whatever other Way. In whatever Manner the old ones are kept, when they have brought forth a ſecond Brood, the firſt is to be taken away, and rear'd up elſe-where. The common Way in this Caſe is, to remove them to other Boxes, keeping thoſe of ſeveral Broods of about the ſame Age together: and thus they are to be treated in the other Way, either rearing them in another Pit, or in any Manner that is convenient, only allowing them ſome Room and Air, the more of both the better.

The Reaſon of chaining up the Buck Rabbit in the Pit, and of keeping him in a ſeparate Box in the other Way, is his miſchievous Diſpoſition, for he will kill all the young ones. This the Does are themſelves ſo ſenſible of, that they, in their natural wild Life, hide the young ones, and cloſe up their Holes, that the Buck may not find them.

The two great Requiſites in theſe Pits are Warmth and Dryneſs: their Depth, unleſs the Ground be very favourable, making them ſubject both to damp and cold, in either of which Caſes the Rabbits will not breed well.

The moſt profitable Time of their Breeding is in the Depth of Winter; and they will never breed at this Seaſon, at leaſt not ſucceſsfully, unleſs they be kept dry and warm.

CHAP. XXVII.

A profitable Method of keeping tame Rabbits.

IT is from the Danger of the Cold and Damp in Pits, and becauſe of the want of Air in Boxes, that I have been led to think of ſuch other Methods as may give Rabbits the Advantage of both in a fit Degree, and yet keep them in ſuch an eaſy and ready Way, that they might be always at hand, eaſily fed, tended, and looked after in every Reſpect, and yet have Warmth and Freedom.

To obtain theſe ſeveral Advantages, by means of which tame Rabbits of the beſt Kinds would be kept in the greateſt Perfection of Health and Beauty, and to the greateſt Advantage of Breeding, let the Huſbandman erect a Building purpoſely for them.

Having choſen his Rabbits for Breed, let them fix upon a proper Spot of Ground for his Edifice, and draw the Plan of it of ſuch Extent as to contain conveniently the Number he ſhall think proper to keep.

Let the Soil on which he builds this Place, be of a dry loamy Kind, with a large Proportion of Sand in it; for this is the Sort of Earth the Rabbit loves beſt, and in which it is always moſt healthy.

Let the Building be ſquare, and run up of Wood in a ſlight but yet a tight Manner; and let there be a Kind of Cloſet carry'd up at one End.

In each Corner of this Square let there be a Den made for a Buck Rabbit, and a ſmall Poſt driven in, to which to faſten him by a Chain, in the ſame Manner as in the Pit. At ſome ſmall Diſtance from the Corners, let there be Racks ſet up for Food, which ſhall be within the Reach of the Bucks, and one or two others in the Middle.

When the Houſe is thus prepar'd, let the Bucks be chain'd in their Places, and the Does turned in. They will all live much more comfortably in this Houſe than in the Pits; and at the Times of taking away their young, let them be put into the ſmaller Rooms or Cloſets, pre-

pared for that Purpoſe, where they will live and thrive very comfortably. A Building of this Kind will coſt little, and the Profit ariſing from the Rabbits will be much greater than in any other Way, becauſe they will breed freely throughout the Winter; and neither the old nor the young will be ſubject to Diſeaſes. Both the old and the young will be, in this Manner alſo, defended better againſt Vermin than by any other Way whatſoever.

The feeding of the Rabbit is an Article of great Conſequence, with Regard to its Health and Encreaſe, and it is leſs underſtood than moſt Things of the like Kind. Some feed them in a Manner entirely with wet Meat, others almoſt altogether with dry: now both theſe Methods are wrong. From what I have ſeen and try'd, a Mixture, or Diverſity of Food, keeps them better in Health and Vigour, and occaſions their breeding faſter, and more ſucceſsfully than any one Kind.

The dry Meat of the Rabbit is Hay, Oats, and Bran. Their moiſt or wet Food is freſh Herbage, or Roots, of almoſt any Kind, which they will eat with the greateſt Eagerneſs, as Coleworts, Parſley, and others, from the Gardens; and Sow-thiſtles, Mallows, and the like, from the Fields. Now theſe I would adviſe the Huſbandman to give them interchangeably; always obſerving this Caution, that when he gives his Rabbits dry Meat, he muſt ſet them Water; and that when they have the freſh or moiſt Meat, they have no Occaſion for any; the Juices of thoſe Leaves and Herbs ſupplying them with a ſufficient Humidity.

It is a common Cuſtom with many to cut up the freſh Food for their Rabbits from under an Hedge, taking every kind of Herb that offers, ſo it be young, and the Rabbit will eat almoſt any; but in this ſome Caution is neceſſary, for the Herb Hemlock is very common under Hedges, and it is poiſonous; the Rabbit will eat it greedily, but it dies by the Effect.

The Hay that is given to Rabbits muſt be the fineſt, ſweeteſt, and ſhorteſt that can be got. Nor let any one grudge the Expence, for they eat but little, ſo that the Amount is ſcarce worth Conſideration.

This is the beſt and healthieſt Food of all others for Rabbits, and ſhould be their ſtandard Diet, but about once in five Days they ſhould have the freſh Herbs, which cool and ſcour them. And by this Management they will be kept healthful and vigorous; always ready for breeding, and their young will be luſty, ſtrong, and thriving.

Among the other Food of the Rabbit ſhould be mentioned Grains: this is of a middle Nature between the moiſt and dry Food; and is a very cheap Diet; but it is not wholeſome, and therefore is dearer in the End. The Rabbits will ſeem to thrive upon it, but there is no Food whatſoever that makes them ſo liable to Diſeaſes.

In general, the Advantage of their dry Meat is, that it prevents Diſeaſes: and thoſe who commonly keep them upon freſh and moiſt Food, as many do, giving them Carrots and other eatable Roots among it, would do well to change it for dry Meat in wet Weather: for moiſt Food is the great Cauſe of theſe Creatures having the Rot, and they are moſt of all ſubject to this in damp Seaſons.

BOOK V. PART II.

Of FOWLS.

CHAP. XXVIII.

Of the Cock and Hen, their Kinds and Choice.

WE come now to the Conſideration of Animals of ſmaller Size, and leſs Advantage than thoſe ſeveral capital Articles of the Farmer's Stock treated of in the firſt Chapters of the preceeding Book; yet not to be neglected. We are led by the Conſideration of the little Animal, laſt named among the Beaſts, to the Creatures of the winged Kind, among which we have begun not with the largeſt Sort, but the moſt uſeful. We have ſeen what conſiderable Profit may ariſe from the Rabbit well managed; and we ſhall ſee here that the Hen, when conſidered with reſpect to her Eggs and Chickens, not to mention her own Body, and the Feathers, affords an Article, though ſmall in Compariſon of ſome among the preceeding, yet very worthy of the Farmer's careful Regard.

Though the Profits ariſing from the Hen and her Kind are ſmall, in Proportion to thoſe of the Ox or Sheep, yet they come eaſier. There is leſs Trouble and Expence in theſe Creatures, even than in the Rabbits. Indeed they in a Manner take Care of themſelves; feeding at the beſt upon the Scatterings of the Barn, with little Aſſiſtance; and maintaining themſelves even where there is not this Help, by their own Care with very little Help.

Fowls are therefore a Stock the pooreſt may keep, and ſuch as the richeſt need not to neglect; they are univerſal, and they very well deſerve to be ſo; and are a Comfort to the Peaſant, while they add their Profit, though ſmall not inconſiderable, to the general Purſe of the wealthy Farmer.

The Huſbandman is therefore to provide himſelf with Cocks and Hens as a material Part of his Stock, and he need not be afraid of overdoing in this Article; for theſe are not like thoſe Creatures, Numbers of which require great Attendance, and rich Paſturage: a very conſiderable Quantity of theſe will provide for themſelves in his Yard, and at the Barn Door, for the greateſt Part of the Year, without doing him any

any Damage, and will be ſupported during the Remainder, at a very ſmall Expence.

The Advantages they afford in Return for this are very conſiderable in their Kind, when the Number is large; and they are in a Manner continual: they are a conſtant Supply for the Proviſion of his Family; and as conſtant for the Market; where, according to their Management, they afford a larger or ſmaller Price.

The Value of every Thing riſes in Proportion to the Demand there is for it, and on this will depend the particular Directions that are to be given to the Farmer in this Article. The great Demand for Fowls is in large Towns, therefore the careful Provider ought to proportion the Quantity of theſe he keeps to his Situation. If he live in a lone Place, it will not be worth his while to keep more than will ſerve for his own Family's Supply, and for a few of his Neighbours who may purchaſe of him: but if he be ſituated near a Market Town, eſpecially if within a due Diſtance of LONDON, he may ſtock himſelf as largely as he pleaſes; and the greater Number the more the Profit; for there is there a conſtant and good Market throughout the whole Year, for one Kind or other in this Way, either Eggs, Pullets, Chickens, Capons, going off at a good Price the whole Year.

Additionally to this, which is the greater Conſideration, he has the leſſer Article of their Feathers; and he has alſo the Dung, which is very rich, as has been already ſhewn in its proper Place.

The Huſbandman therefore by this Conſideration, will be led to the fixing upon a proper Number of this Kind of Stock, and after that he is to acquaint himſelf with the Choice before he makes his Purchaſe. A great deal depends upon the firſt Choice in all theſe Caſes: the whole Brood to come is to be of the ſame Kind with theſe, which are the general Parents.

The Induſtry and Curioſity of thoſe who breed Poultry of this Species for their Pleaſure or Profit, have of late Years greatly multiplied what are called the Breeds: but theſe Differences are not ſo great as many imagine. They ariſe from ſmall Diſtinctions, and will ſometimes go off in the Continuance. Between the Darking Fowl, and the little Bantam Breed, there are many Degrees in Bigneſs; and the Game Breed is altogether diſtinct from all theſe; anſwering the Purpoſes of the Sportſman, not of the Farmer.

Among the ſeveral Breeds I would adviſe my Huſbandman to chuſe, not fixing himſelf to one in particular according to what he ſuppoſes to be its Value above the reſt, but conſidering which will beſt anſwer the Demand he is like to have for the Produce. In ſome Meaſure, indeed, he is to be guided in this by the Circumſtances of his Farm; as in the Choice of his Oxen and Sheep, by the Richneſs of his Paſtures. He who has a good Barn Door, and a rich Yard, will be able to keep a proper Quantity of the largeſt Breed of theſe Fowls in Health and Vigour: the common or ſmaller Kind will ſucceed beſt with the Peaſant or the poorer Farmer, for they will ſupport themſelves by running about the Roads and Hedges, in a great Meaſure; eating Inſects, Seeds, and whatſoever can afford a living Creature Nouriſhment.

Thus upon theſe two Conſiderations of the Food and the Demand, taken together, the Huſbandman, of whatſoever Rank, will be able to know which of thoſe ſeveral Breeds that are now ſo common in all Places, it will be his Intereſt to take.

Whichſoever Kind he fixes on, let him obſerve theſe Marks of Goodneſs in the particular Fowls he buys, and guide himſelf by them in the Choice.

Let the Cock be large for his Kind, full bodied, well ſhaped, and lively: the Cock is naturally an upright, ſtately, and majeſtick Bird; and when he appears without theſe Characters, 'tis a Proof that ſomething is amiſs. The Cock that does not ſtrut, is not fit for the Father of a Brood. He ſhould be long in the Body, and thick in the Garth. His Neck ſhould be long and naturally arch'd, free in its Motions, and well cover'd with Feathers. His Comb and Watles ſhould be large, and of a bright red; his Eyes full and ſprightly, and their Colour anſwerable to that of his Feathers, which is a great Beauty in the Cock, and a Mark of a right and true Breed. His Beak ſhould be ſtrong and hooked, his Legs ſtout and ſturdy; his Spurs long and ſharp, and his Claws ſhort and ſtrong. Theſe are the Marks of a good Cock, of whatſoever Breed. Some have made a great deal of the Colour, but the two beſt are the red and the white, of which the red is fitteſt for a ſtout breed, and the white for a more delicate.

In the Choice of the Hen, the ſame general Marks are to be obſerv'd as in the Cock, only her whole Aſpect ſhould be mild as the Cocks is ſturdy. She ſhould be lively and well colour'd; her Claws ſhort and ſtrong; but if ſhe want the hinder Claws, it is ſo much the better. They often breaking the Eggs in her ſitting.

When the Cocks and Hens are thus choſen, let them be well obſerv'd as ſoon as they are put into the Ground, for if any Thing be amiſs in them, that is the Time to change; and it is much better to ſell the bad again, and buy others, than to ſit down content with ſuch as are not of the beſt Kinds in every Reſpect; the Loſs attending this can be little, and is for once; but the Diſadvantage of having a bad Kind is great and continual.

The Cock ſhould be lively, buſy and noiſy: he ſhould be often crowing; and from time to time ſcratching up the Ground to turn up Worms and other Food for the Hens. The Hens ſhould be lively, but quiet; a crowing Hen is as much to be rejected as a dumb Cock: for theſe are found by Experience, neither to lay any Quantity of Eggs, nor to ſit well.

Now if any of theſe Faults appear in the Fowls that are bought for the Breeders of a Stock, let ſuch as have them be changed; and this done over and over again till ſuch as are in every Reſpect right, are fixed upon.

The Proportions of the two Sexes is about one to ten: a ſingle Cock will ſerve twelve or fourteen Hens; but the moſt profitable Way is to allow a Cock to every ten of them; and this

this Way they will breed to the fulleſt Advantage.

CHAP. XXIX.

Of the breeding of Poultry.

THE Yard being thus ſtock'd with theſe Poultry in proper Number, of the fitteſt Kinds, and with the choiceſt of the Breed, the Farmer is to conſult the managing them to the beſt Advantage for their Breeding.

The Age is a conſiderable Article in this Reſpect; and he is to be very careful in ſuiting their Employment to that: for it would be very ill Huſbandry to ſtop the profitable laying of a young Hen, by ſetting her upon her firſt Eggs, when there are ſuch as are fit for nothing elſe, and will do this better.

As the youngeſt Hens are always the beſt Layers, and thoſe advanced into Years are the beſt Sitters, let theſe be managed ſeverally accordingly. And in both theſe Reſpects the Farmer is to have Regard to the feeding: for any Extream is equally wrong, whether in Exceſs, or in Defect. If they be ſtarved or kept too low, they will want Strength and Spirits; and if they be fed too high they will grow fat. A fat Hen is always lazy, and will never lay well, nor ſit quietly. The feeding them moderately while laying, or while ſitting, is the right Method.

The beſt Seaſon of the Year for Hens ſitting, is Spring and Summer; the earlier in Summer the better, and the firſt Months of Spring beſt of all. MARCH is the beſt Month for Chickens to be hatch'd, and the Middle of that Month is the moſt favourable Time of the whole Year. The Hen ſits only twenty Days, ſo from this Account it will be eaſy for the Huſbandman to know when to put her upon the Eggs for the beſt Brood; that is, in the laſt Week in FEBRUARY; and from that Time he may continue breeding till the firſt Week in OCTOBER.

The prudent Huſbandman ſhould never ſet a Hen that is leſs than two Years and a half old; from this Time to five, or between five and ſix Years is the beſt Time of that Creature's Life for ſitting, and producing Chickens. The fineſt Broods will be obtained when theſe two Conſiderations are regarded together; that is, when a Hen of a good Breed, and of about three Years old, is ſet in the Middle or End of FEBRUARY, upon a Parcel of well choſen Eggs laid by a young Hen of a good Kind alſo, who has let no Cock come near her but her own, that the Breed may be kept entire.

We have obſerv'd, that in order to the haveing a due Quantity of Eggs, the Hen that lays muſt be kept moderately: ſhe muſt be fed ſo as to have Health and Vigour, and not to grow fat: but there is ſomething to be ſaid for the Kind of Food, as well as the Quantity.

The Pretences of increaſing the laying of Hens by particular Diet, have been ſlighted by ſome; but they have been ſince confirmed upon the repeated Trials of others, and no Argument can ſtand againſt Experience. Many Kinds of Food have been preſcribed for this Purpoſe, but there are two moſt authorized by Experiment, theſe are Buckwheat and Hempſeed: the Effect of theſe is equal in Reſpect of laying; but the one fattens at the ſame Time the other does not, therefore the Condition of the Hen is to fix which is preferable.

If ſhe be inclined to fat, then Buckwheat muſt not be given, becauſe while it tends to make her lay by its common Virtue, it will alſo increaſe her fat ſo as to take her off: in this Caſe Hempſeed is the proper Kind. On the other hand, when a Hen is poor, the proper Kind is Buckwheat, for at the ſame Time that it inclines her to lay, it gets her into Fleſh.

As to the Number of Eggs to be put under a Hen for ſetting, there have been different Opinions; but by what I have found from many Trials, the beſt Number is ſeventeen. Let Care be taken that they be freſh and ſound Eggs, and let the upper Side of every one of them be mark'd blue; when the Hen gets from her Neſt for feeding, or waſhing herſelf, let the whole Number be carefully examin'd to ſee if ſhe have turn'd them all, or any of them. Such as ſhe has not turn'd, the Owner muſt ſee turn'd for her. And from this he will know how to value her for ſetting afterwards; for the Hen that turns all her Eggs herſelf, is greatly preferable to thoſe negligent ones which omit that needful Caution.

Every good Houſewife knows how to judge of the Newneſs and Soundneſs of her Eggs by holding them up to the Light, and ſeeing that they be full and clear. This is never ſo neceſſary as in the Choice of thoſe Eggs which are to be ſet for hatching.

When a Hen is ſet, ſhe muſt never be diſturbed againſt her Will; and ſome Care muſt be taken to ſet her Food and Water. If ſhe be put from the Neſt againſt her Will, ſhe often forſakes it entirely; and if ſhe be obliged to go to ſeek for Food and Drink, oftentimes ſhe is obliged to be abſent ſo long in the Search, that the Eggs chill, and the Chickens are killed in them.

This Care is needful during the whole Time of her ſetting, but is moſt of all to be ſtrictly obſerved toward the End of the Period. The Chickens are then formed in the Eggs, and they require the conſtant Warmth of the Creature's Body to keep them alive, a ſmall Time of chilling will utterly deſtroy them.

When the Hen riſes from her Eggs, eſpecially at theſe Times, to feed upon what is ſet before her, the Perſon who has the Care of her, ſhould ſtir up the Straw of her Neſt, and lay the Eggs regularly together, that ſhe may find all convenient and agreeable at her Return.

The Cock is alſo to be watched upon theſe Occaſions, for when the Hen is off her Neſt, he will offer his Service to ſet for her, but he does this very awkwardly, he frequently breaks ſome of the Eggs; and the Hen is always diſpleaſed at it. Sometimes ſhe will entirely forſake the Neſt upon it.

In the Choice of Eggs for ſetting, if there be any larger than uſual, they are to be rejected, for

for they will not lie even, and will cool thoſe that are next them. Theſe often have a double Yolk, and they are the Eggs which commonly produce thoſe monſtrous or misſhapen Chickens, which ſurprize the common People, among the Broods of this Creature.

As nothing more is requir'd for the hatching of Chickens than a due Degree of Heat, there has been long a Cuſtom in Ægypt, of hatching them without the Help of Hens, in Ovens, by Means of a ſmall and regular Fire. They in this Manner produce vaſt Broods at a Time. This Cuſtom has of late been attempted to be brought into Europe; in France the celebrated Monſieur de Reaumur has made many Experiments, and at length with ſome Succeſs. From the publick Account he gave of this, the ſame has been attempted in England, and among other ingenious Perſons, the Honourable Mr. Stanhope try'd it, and ſucceeded: but there does not ſeem any Probability of its being brought into common Uſe; and indeed ſo much Nicety is required in the Thing itſelf, and ſuch a great deal of Care of the Chickens after they are hatch'd, that it appears rather fit for an Amuſement for the Curious, than an Employment for the Huſbandman. We have ſeen that it may be done; and that is all that 'tis worth our while to regard about it.

If it happen that a Hen dies, or a Brood become by any Accident Motherleſs, the beſt Method is to mix them among the Chickens of another Hen that are about the ſame Age, and ſhe will take Care of all together. A Hen may thus be brought to conduct and aſſiſt three or four Broods: and this is the moſt favourable Circumſtance concerning the hatching of Eggs by Art; but there is a Limitation in the Number; and at preſent the Attempt is not to be recommended to any on the Foundation of Utility or Profit.

Although we have fixed the ſetting of the Hen to the Summer and Spring Months, it is not to be underſtood that they will not ſet at other Times. Eggs may be put under them at any Seaſon of the Year, and they will hatch them; and for thoſe that chuſe to beſtow a ſufficient Time and Attendance upon them, the Winter Broods may be worth raiſing, for they bear the beſt Price when they are grown up for Sale in Spring. This, however, requires more Trouble than the Huſbandman can well beſtow upon ſo ſmall an Article in his Stock; and therefore it is we have recommended the ſetting of the Hens in the End of February to any other Time; for a Brood of March Chickens will be worth near twice as much to him in this general Way, as thoſe of any other Time.

When the Breed of Chickens is the only Care, the white Fowls with white Legs and white Beaks are to be prefer'd to all others, becauſe of the Whiteneſs and natural Tenderneſs of their Fleſh, and their Price on that Account in the Markets: but theſe are not the beſt Layers.

Therefore if Eggs be the principal Care, the red Cock and mottled Hen are to be prefer'd.

If a Hen that has been fed with Buck-wheat to make her lay frequently, grow too fat upon that Diet, ſhe muſt be fed with Oats: for they at the ſame Time that they take down her Fat, aſſiſt her breeding of Eggs.

In all theſe Articles of feeding, it is not intended that the Fowl ſhould be kept upon thoſe Things entirely. She ſhould be left to take ſome Care of herſelf abroad, for her ſtirring about will do her Service; only what Addition to her natural Food is requir'd to keep her in Health and Strength for laying, ſhould be of theſe Kinds.

CHAP. XXX.

Of the bringing up of Chickens.

WE have led the Huſbandman, or rather the good Houſewife, (for this Care naturally falls upon her) from the Purchaſe of the Stock in this Kind, to the hatching of the young Brood: theſe are the moſt eſſential as well as the moſt valuable Articles that falls under this Head, and we ſhall therefore lay down ſuch Rules for the breeding them up to the Condition for Market, as Experience has ſhewn are the moſt uſeful.

We have mention'd twenty Days for the Time the Hen ſets: this is the earlieſt Period at which an Egg hatches, and as ſome are longer than others according to the Thickneſs of the Shell, their Place under the Hen, or other Accidents, they ſometimes are one and twenty, and ſometimes two and twenty Days.

In this, Patience is the Remedy. There have been ſeveral Ways propoſed of aſſiſting the Hen in hatching, and the like, but they are fooliſh and unneceſſary. All is to be left to Nature.

In large Broods eſpecially, it often happens that ſome Chickens are thus hatched a conſiderable Time before the others, often one, and ſometimes two Days. In this Caſe let the Hen be watch'd to ſee how ſhe treats them, for if ſhe be careful, nothing better can be done than to leave them with her. But if ſhe be reſtleſs, and ſeem troubled with them, it will be beſt to take them away.

In this Caſe let a little Wool be put into the Bottom of a Sieve, and let them be ſet in the Reach of the Warmth of the Fire, if the Air be chill; and thus nurſed up till the Hen has hatched the reſt, and can take them under her Care. During this Time nothing is needful but to keep them warm, for the Chicken in the two firſt Days requires no Food.

For the firſt feeding of the Chickens, the beſt Thing in the World is a Mixture of white Bread Crumbs and ſmall Oatmeal. Let a Quantity of theſe be mix'd well together, and then put a part of it to ſteep in Milk, and keep the reſt dry. Give the Chickens a little of each Sort at Times, as they follow the Hen.

After they have thus got a little Strength, they are to be fed with Bread ſteep'd in Milk, and then with Barley-meal and Cheeſe-parings cut ſmall, and the like, and the Hen will by this Time greatly aſſiſt in the providing for them, tho' at the firſt ſhe can do little more for them, than the keeping them together, and nouriſhing them by her Warmth.

In cool Weather it is always beſt to keep young Chickens within Doors, till they have got ſome Strength. At the worſt Seaſon, during the Months we have recommended for breeding theſe Creatures, they need not be kept within Doors above ten or twelve Days, after which they may be ſuffer'd to go about Abroad with the Hen; and in the better Seaſons, the leſs of this keeping them within will be neceſſary; often ſcarce at all.

It is a very material Thing to let the Chickens, while they are young, have good Water, for they fall into half the Diſeaſes to which they are ſubject, from the being obliged to drink ſuch as is foul, or any thing they can get at.

By Means of the Food we have directed for young Chickens; and the giving them Bread, ſcalded with Milk, and ſome Barley Meal afterwards, they may be fatten'd up while they are under the Hen. This is a very common Practice in IRELAND, and according to the common Error of Expreſſion in that Country, they call theſe ſucking Chickens.

The moſt general and uſeful Time of fattening them is, at a ſomewhat more advanced Growth. To this End when the Hen forſakes them, which ſhe always does as ſoon as they are fairly able to provide for themſelves, they ſhould be taken up and put into Coops, in a darkiſh Place, and there fed for fourteen or fifteen Days. Their Quietneſs aſſiſts greatly to the fattening of them; and they will always be moſt quiet where they have leaſt Light.

In theſe Places they are to be fed in the Manner that is called craming, and the beſt Food is ordinary Wheat Flour, made into a Paſte with Milk. This is to be ſoak'd in Milk, and then broke into ſmall Pieces, which are to be put down their Throats, always wetting them well in Milk firſt, that they may go down eaſily.

Some prefer Barley Meal to Wheat for this Purpoſe; and others ſpeak greatly of the Meal of Buck-wheat: but from many Tryals it appears, that Buck-wheat Meal does not anſwer well alone. A little of it mix'd with the Wheat Flour before it is made into Paſte, may do very well; but too much is not profitable.

There is one Article attending this Manner of fattening Chickens for the Market, which ought to recommend it greatly to the Huſbandman, that is, the Advantage of their Dung. The Price they bring at Sale will very well pay the Expence and Trouble of this Way of feeding them, and he has this Addition to the Profit. We have mentioned, in its Place, this Article of the Dung of Poultry, and here it has a great Advantage, as it is naturally collected together, and he may uſe it before it has loſt any Part of its Virtue, by being expoſed to the Air.

CHAP. XXXI.

Of Capons.

THE Capon which, when properly managed, is a delicate Bird, and brings a good Price, is the common Cock gelt, and fed properly.

The Time for gelding the young Cock is either as ſoon as the Hen has left the Chickens, or if the Teſticles be not, at that Time, come down, he is to be watch'd, and to be gelt as ſoon as he is heard to crow; for at this Time the Teſticles are always eaſy to be found.

The Art of Gelding, which by a peculiar Term is called Carving, has nothing particular or difficult in it. The Teſticles are to be cut out, and the Wound heals of itſelf without any Kind of Trouble.

The Hen being ſpay'd fattens in the ſame Manner, and with the ſame Management becomes a very fine Fowl.

The Capon being naturally inclined to fatten, will grow to a fine Size and delicate Fleſh in the Yard, and at the Barn-Door, without any particular Care or Trouble: if ſome Meat be given him additionally to what he thus picks up, he will come into good Caſe the ſooner, and thus be very well fitted for the Table; but in order to make him bring the largeſt Price at Market, he is to be cram'd in the Manner of Chickens. This makes him grow, in a little Time, to a great Bulk; and makes his Fleſh very delicate.

In order to cram Capons, let them be taken up and kept in a ſmall, quiet, dark Place. Where they are to be fed in the Way of the Chickens, and their Dung is to be ſav'd in the ſame Manner, it being of equal Value.

The beſt Food is found to be Barley Meal, mix'd with Milk into a Kind of Paſte: this is to be of a moderate Stiffneſs; and is to be ſhap'd out into long Pellets, which they call Crams, largeſt at the Middle, and ſmaller at the Ends; theſe are to be wetted in warm new Milk, to make them go down eaſy; and he is to be fed with them three Times a Day: this is to be continued eighteen or twenty Days, and he will then be a fine Creature.

Regard ſhould be had to the Dung, not only for its own Value, but for knowing the Capon's Health. The general Rule is this, the finer the Meal be ſifted the ſooner it paſſes through him: ſo that by this Means only, of giving it finer or coarſer, he may be kept in a proper Condition during the whole Time of his craming.

If the Huſbandman live at a Diſtance from any large Town, or where there is not a Demand for Capons for the Table, it will not be worth his while to cram any; but ſtill he ought to breed ſome always among his Stock, becauſe they will come into a very good Condition for his own Table, by feeding in the Yard among his other Poultry; and they may alſo be put to a very conſiderable Uſe, in the bringing up Broods of Chickens, or any other Kind of Poultry. The Capon is to be tricked into this at firſt; but when he has once well taken to it, he will be vaſtly pleas'd with it; and will diſcharge his Duty like a Mother.

For this Purpoſe, the large Bulk, and ſoft Fleſh of this Fowl is an Article of great Advantage, for he is able to cover a larger Number of Chickens than an Hen can, and he will keep them warmer.

The thing that tempts the Capon to take this

Charge upon him, is the Pleaſure he has in feeling their ſoft and tender Bodies; and the good Houſewives having found this out, uſe a Method to make it more comfortable to him, by purpoſely putting him to pain, that he may want it.

To this Purpoſe they ſting the Breaſt and Belly of the Capon with Nettles, pulling away a Part of the Feathers for that Purpoſe: they do this toward his rooſting Time, and then in the Dark they put the young Brood under him, the Warmth of their Bodies allays the itching, and when he ſees them in the Morning he takes to them, and will lead them as naturally as a Hen.

The Care of the Capon, in this Inſtance, is not limitted to Chickens; for he will, in the ſame Manner lead young Turkeys, Peahens, Pheaſants, Ducks, or Partridges, and will be better to them than their natural Mother, fighting any of their Enemies, and ſheltering them under his Body on every Occaſion. If he grows negligent of them before they are fit to be left to themſelves, the Method is to ſting him again, and he will take to them as naturally as at firſt. Some ſcratch the Capon with Briars, or prick him with Furzes, to this Purpoſe, but theſe are more cruel Ways, and do not anſwer the Purpoſe like the ſtinging.

Before we cloſe this Head of Fowls it may be proper to give the good Houſewife one Caution about the collecting of her Eggs, eſpecially when ſhe has a large Stock of Poultry. The Eggs ſhould be taken out of the Neſt every Day, and the proper Time is the Afternoon, when every Hen has left them. The Neſt Egg is always to be left, but never any more; and in the Place of a Neſt Egg, ſome cut a Lump of Chalk into the Form, and it anſwers the Purpoſe.

Many Hens make ſuch a cackling as ſoon as they have laid, that the Houſewife may be aſſur'd by that, of her Time to go and take their Eggs, but they do not all do this: ſome make no Noiſe; ſo that the beſt Way is to have one Time of the Day to go the Rounds when every Hen is off, and collect all the Eggs together.

The Preſervation of Eggs for their keeping a long Time, is a thing that has employed the Thoughts of many, and a great Number of Methods have been propoſed, many of them idle enough, but ſome uſeful. They have been laid in Straw and in Bran, but the firſt keeps them too cold, and the latter too hot. The putting them up in Malt has been found preferable to either of theſe. But the beſt Method is by dipping them in Fat.

The Way that an Egg ſpoils is by the waſteing of its Moiſture through the Shell, and this is prevented by any thing that will ſtop up the Pores of the Shell. No Method is found to anſwer this End ſo well as the covering them with ſome fatty Subſtance; and the beſt Way of doing this is by melting a Quantity of Fat over the Fire, and dipping the Eggs in it. They will bring away ſo much as will cover the Shell ſufficiently for this uſeful Purpoſe.

We owe this Invention to the French, and it has been diſcover'd by their Philoſophers; for in that Country the greateſt Men are not aſhamed to meddle with the meaneſt Subjects that can be of publick Utility.

CHAP. XXXII.

Of Turkeys, their Kinds and Choice.

THE Turkey is a very large and fine Bird, and exceedingly well worth the Regard of the prudent Huſbandman. There are Advantages and Diſadvantages attending upon the raiſing of this, as other Kinds of Fowl; but all being weighed together, the former far outweigh the latter, and the Intereſt of the Farmer will lead him to think very ſeriouſly of receiving them as a Part of his Stock.

There is alſo this farther Encouragement to his Induſtry, that a great many of the Diſadvantages attending the keeping of this Fowl, may be remedied or prevented by prudent Management: and that there is no kind among all the Poultry which will afford ſo many Opportunities of Improvement. There are ſeveral Breeds of the Turkey, much more different than thoſe among the Cock and Hen Kinds; and the properly chuſing among theſe, will greatly add to the Profit and Eaſe of keeping them.

Among the Advantages of the Turkey may be reckon'd his Size, the Price he fetches at Market when in good Condition, and the Quantity of his Dung, which is as valuable as any other Kind whatſoever. He is fit for Sale alſo in the common Condition at a good Price; and his Feathers are not to be neglected, in counting up theſe Benefits.

Among the Diſadvantages of Turkeys are to be reckon'd their ſtraggling Diſpoſition, their being liable to many Accidents, the Difficulty of raiſing them, and the frequent Deſtruction of them by Vermin; as alſo the Quantity of Corn they devour. If fed altogether with this, they will eat more than they can ever be worth; but to this it may be anſwer'd, that the feeding them with Corn is not neceſſary, for they will in general provide very well for themſelves; and in the ſame Manner we ſhall ſhew that every other Objection made againſt them may be removed: and that it will be greatly to the Farmer's Advantage to raiſe them in moſt Places.

This Kind of Bird always ſucceeds beſt for the Owner in open Countries, becauſe theſe are not ſo much infeſted with Vermin: and they are ſubject to ramble and to be deſtroy'd more than any Kind, as obſerved already. This may be a very reaſonable Caution for the Huſbandman not to keep them in improper Places; but we have Counties enough in England that are not at all liable to that Objection. We have often told our Pupil in theſe Studies, that he is to ſuit his Stock to the Nature and Circumſtances of his Farm; and this is only one Inſtance of that general Neceſſity.

There are ſeveral ſmaller Differences among Turkeys, reſpecting Colour and other Accidents; and there are Diſtinctions of more Conſequence, as they depend upon real Differences in the Kind. Among the common Breed of Turkeys there are two Sorts diſtinguiſhed by their Colours, a whitiſh or grey, and a darker. Theſe differ in many Reſpects: but the principal is this, that the white Kind breed excellently, but they

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are tender, and the others require leſs Care, but they do not raiſe ſo many young.

It is a Thing remarkable in all the Turkey Kind, that they take very little Care of their Brood: but theſe leaſt of all. If a common Turkey, of the white Kind, have a large Number, ſhe will never miſs half of them, ſo the reſt keep about her; but among the black Kinds, if a ſingle young one follow the Hen, ſhe never thinks of the reſt, if they be all loſt; and even this Straggler ſhe will drop with very little Regard or Notice.

The Farmer is therefore here directed in part in his Choice. If he intend to beſtow a great deal of Care upon his Turkey, the white Kind are to be prefer'd, for they breed the beſt; but if he cannot beſtow ſo much Time upon them, let him chuſe the black: all that is neceſſary about theſe is to ſee that they are not deſerted while they follow the Dam, for after this they will take Care of themſelves.

There are Turkeys much more different from theſe than they are from one another. Of theſe the wild Turkey of Virginia is the moſt valuable: this is large and dark colour'd. There is alſo a ſmaller wild Kind, of a dark Colour, that is much hardier. Either of theſe may be raiſed by the Farmer; or he may mix the Breed by coupling one of our common Turkey Cocks with a Hen of one or other of theſe Kinds. The English and Virginian Turkey make a very good Breed, as has been found long ſince by Experience. The young from this Mixture are hardy, and will ſoon take Care of themſelves; and they are larger, and every Way better than the common Breed: they will raiſe their young ones with Care in the Fields, and bring them in at an Age when they can ſhift for themſelves.

Whatever Breed of Turkeys the Farmer ſhall, according to the ſeveral Circumſtances of his Situation, prefer, let him take Care to chuſe for that Purpoſe ſuch as are good of the Kind; and particularly the Cock. He muſt be a tall, ſtout, luſty, and ſpirited Bird. The Turkey is naturally ſtately and majeſtical; and the Cock that is choſen for the Breed ought to be ſo particularly. For if he hang down his Head and look peaking, he never will be good for any Thing as a Father for the Brood. The Hen ſhould be large and vigorous; and it is a general and true Obſervation, that ſuch as are tameſt are the beſt for the Care of their young.

CHAP. XXXIII.

Of the breeding and raiſing of Turkeys.

THE firſt Article to be conſider'd in reſpect of the Breeding of Turkeys is the Age of the Cock and Hen. The Cock muſt be young, for the Brood is never good unleſs he be in the Vigour of his Life; the Hen may be older, for her Care in ſitting and leading them is all that is requir'd of her, and in the latter Article the Cock often aſſiſts her, when he is of a kindly Sort.

The Turkey Cock for Breeding, ſhould be about two Years old; and the beſt Time for the Hen is at about four Years: ſhe may be employ'd in breeding till ſhe is ſix; but when ſhe is too young, ſhe is moſt apt to neglect the Brood; and when the Cock is at all declin'd from his Strength, they are weakly.

Turkeys are not natural to our Kingdom, and there is therefore always a Wildneſs about them. The Female of this Kind does not lay familiarly and conveniently about Houſes as the common Hen, but rambles to a Diſtance, and makes her Neſt among Thickets: for this Reaſon her Brood is from the Beginning more liable to Accidents. The Farmer muſt therefore be watchful about the Time of her laying, and take Care to get her into the Hen-houſe, and compel her to lay there: for this is the firſt Precaution, and it is a very eſſential one about the Brood.

It is a Cuſtom with ſome, if there be Convenience of Thickets, or a little Wood near the Houſe, to let them take their own Way, and lay and ſit there; and in the hardier Breeds, with a little Care of the young when new hatch'd, this will do very well; but there is never any Harm in the other Method, whatever be the Breed; and there is a much greater Certainty of Succeſs.

The Turkey naturally begins to lay in the Month of March, and will ſit in April. The Eggs are very large, and are excellent in the way of Food, particularly they have a reſtorative Virtue.

The proper Number of Eggs to let the Hen ſit upon is eleven, ſome adviſe thirteen, but commonly there is leſs Succeſs in that avaritious Method, for they cannot be all well cover'd.

It may be obſerv'd, that in talking of the Quantity of Eggs to put under a Hen Fowl of any Kind for ſetting, we generally ſpeak in odd Numbers, as eleven or thirteen, not naming ten, twelve or fourteen. The good Houſewifes have been taught from Generation to Generation, to put always an odd Number; and tho' they know nothing of the Reaſon they practiſe it ſuperſtitiouſly: the Occaſion is, that an odd Number will lie better, and in a more compact Heap, when we come to ſuch Quantities as are uſually ſet, than an even. This is owing to the Shape of the Eggs, and is a Fact any one may ſee on Trial; and on this is founded that old Maxim.

The Turkey ſits about ſeven or eight and twenty Days. Some of the Eggs will ſometimes be hatch'd at five or ſix and twenty, and ſome will lie till thirty, but the middle Time is the moſt natural.

The hatching of the Brood is the Time when the great Care is requir'd in their Management. The Turkey being naturally a Bird of a warmer Climate, is chill in this; and particularly the tender young. They muſt be kept very carefully at firſt, eſpecially ſuch as happen to hatch before others of the ſame Brood: the beſt Way is to put them into a Baſket with Wool in it, and ſet them before the Fire, at ſuch a Diſtance as to be gently warm'd.

From this Time the Farmer is to depute ſome body to act as a Parent for them, for the Hen is not to be expected to do much: they will follow her, and ſhould be permitted to do ſo in the

the warm Part of the Day, and ſhe ſhould be manag'd to take Care of them. The Cock alſo will often watch over them, keep them together, and defend them better than the Hen; but neither are to be truſted without careful looking after.

The proper Method of managing them is this. They are to be kept in a warm and cloſe Place altogether while they are very young; and when they have got ſome Strength, they are to be let out two Hours after the Sun is up in the Morning, and taken in again before he ſets in the Evening: and in the mean Time they ſhould only be let into ſome walled Place, or ſome Incloſure ſo ſecure that they cannot ſtray.

At firſt they are to be fed in the Houſe, and afterwards in this open Place: and at all Times they muſt be allowed a ſufficient Supply of Food, for their Parents take at beſt but little Care to help them to any. The very beſt Food for them is green freſh Cheeſe, and while they are young, their Drink ſhould be only new Milk; afterwards Milk and Water, making it weaker and weaker till they come to Water alone, which they will then drink wherever they can find it. Curds are a very good Food for them, but not ſo well as Cheeſe. A very wholeſome Food alſo is a Kind of thick haſty Pudding made of Oatmeal, Water, and a little new Milk among it.

As the Tenderneſs of the young is one great Article in the Diſadvantage of the Turkey, indeed the greateſt, Care muſt be taken that the Hen do not ſet herſelf at too early a Seaſon. If the young are hatch'd in cold Weather, it is ſcarce poſſible to rear them without conſiderable Loſs; but if they be produc'd toward the latter End of May, which indeed is the moſt natural Time, as well as the beſt, they will have a much better Chance.

It is only while young that this Bird is ſo exceedingly tender; for, when grown up, it will bear the coldeſt of our Weather very well. Grown Turkies will ſtand our ſevereſt Winter Nights expoſed, better than our common Fowl. They are frequently ſubject to be loſt while young, by ſtraggling from the Dam, and one another, in which Caſe they become an eaſy Prey to any Kind of Vermin; but it is only while they are young that they are liable to this; for, when grown up, they are not only ſtrong enough to defend themſelves; but they always love to keep in Flocks together.

The Huſbandman who keeps many Turkeys, muſt take a great deal of Care to keep them out of his Garden, for no Bird does ſo much Miſchief there: but their Profit is very well worth the Trouble they occaſion in this and other Articles.

When the young Turkeys have by the Means already directed, been raiſed to ſome Strength and Bigneſs, they may be left to themſelves. They had Reaſon to complain of the Expence of keeping theſe Fowls, who feed them conſtantly with Corn, from the Time of their firſt eating dry Meat to the fattening of them; for they are very great Devourers: but we find by Experience, there is no Occaſion to feed them at all, either with that or any Thing elſe, till they are to be got ready for Sale. They will at all other Times take ſufficient Care of themſelves, and keep in very good Caſe with what they find under Hedges, and in the Yard.

They are naturally in better Caſe in Winter than in Summer; for they are an indolent Bird, but the Cold gets them a Stomach: and this is the beſt Time for fattening them for the Market.

In order to do this they muſt be taken up and houſed; but it is beſt not to keep them up entirely, for they will in that Caſe loſe their Food, and come on poorly. They muſt therefore be let out the greateſt Part of the Day, but it is beſt to keep them where they cannot run much about at theſe Times. The Food to begin fattening them with is good Barley, boiled till it is ſoft: Oats will do; but the Barley is found better. Let them have Plenty of this for a Fortnight, with ſome Air and Sunſhine, but a great deal of Reſt. After this they are to be cram'd every Morning as Capons are, with a Paſte made of Barley-meal and new Milk; this is to be made into long Pellets, and wetted in warm Milk to make it go down. They are to be well fed with this in the Morning, and then ſuffer'd to go out, but they are to be kept as quiet as may be. They are not to be cram'd any more each Day, beſide this Morning feeding, but during their being out, Corn is to be thrown to them at Times: this will keep them eating, and keep them quiet, for having Food thus before them, they need not ramble about to ſeek it; and thus they will in a little Time fatten up in a very fine, and even a ſurprizing Manner.

This is their proper Management from the Egg to the preparing them for the Market; in which it is plain, that all the Diſadvantages ſuppoſed to attend them, may very eaſily be obviated and prevented; and that all the Care that is needful about them is, when they are very young, and when they are preparing for the Market: at the firſt of theſe Times the leaſt Cold kills them; and at the other, they will not fatten well unleſs carefully tended: all the reſt of their Lives they provide for themſelves; and the Price they bring, whether ſold as Poults, or when grown up and fatted, is ſo conſiderable, that it very well anſwers all the Trouble.

CHAP. XXXIV.

Of Geeſe; their Kinds, and the Profits of keeping them.

THE Gooſe is a Fowl different in its Nature and Qualities from the Hen and Turkey, they living on Land only, and this, though in a great Meaſure on Land, yet a Part of its Time in the Water; for which it is qualified by the Nature and Make of its Feet contriv'd for Swimming.

The Huſbandman will therefore find it needful to conſider, in order to his determining concerning this Article in his Stock, how he is ſituated with Reſpect to Water. Of the ſeveral Water Fowl that are bred tame, the Gooſe is leaſt

leaſt devoted to that Element, as it walks the beſt of any of them on Land, and finds the greateſt Part of its Food there. We ſee alſo that Geeſe will live where there is but little Water: but let not this miſlead the Farmer into an Opinion, that this Element is little needful to that Fowl, for tho' they will live where there is but little, they always thrive better where there is more.

The Huſbandman is to conſider, when he is about to raiſe his Stock, what Kinds ſuit him beſt according to the Nature of his Situation; and from this he is to be led in his Choice which to have in the greateſt Number. I would adviſe the Farmer, where he has but little Water, to breed ſome Geeſe; but where he has much of it, only to fall greatly into that Way.

Some may fancy it leſs worth while in any Caſe to be very careful about theſe Fowls, becauſe their Profit is leſs than that of the Hen or Turkey; but the Trouble requir'd about them is alſo leſs: and their Value is not ſo ſmall as ſome affect to make it. They are ſold at a good Price in Spring when they are young, and in Autumn when full grown; and beſide this, there may be a very great Profit made of their Feathers: many Millions of Geeſe are raiſed in ſome Parts of this Kingdom for no other Uſe whatſoever; and the Profit is found ſufficiently conſiderable.

I would therefore adviſe the Farmer who ſhall be conveniently ſituated for the breeding of Geeſe in Quantities, to look upon them as an Article of ſome Conſequence in his Stock; and I would have no one who has any Quantity of Water at all for them, utterly neglect them.

There are three or four diſtinct Breeds of Geeſe in different Parts of the Kingdom, though they are not ſo much regarded as the ſame Kind of Differences among other Fowls. We have alſo ſome others of Curioſity, but they are not worth the induſtrious Huſbandman's Conſideration.

The large grey Gooſe that is bred in the Fen Countries is preferable to any other Kind, both for Fleſh and Feather, and it grows to the biggeſt Size of any. We have beſide this a ſmaller grey Gooſe, and a ſmall dark colour'd. Neither of theſe are nearly ſo advantageous as the grey; and among the large Kind that are ſo called, thoſe are much better which are all of a Colour, than ſuch as are pyed or mottled.

This is to be obſerved, that ſome of theſe Breeds are more under a Neceſſity of Water than the others. The ſmall bodied dark colour'd Gooſe, of which Kind there are ſome almoſt black, will do where there is ever ſo little, but they are the leaſt profitable Kind of any. The large grey Gooſe requires moſt to have Plenty of Water, nor does it any where ſucceed ſo well as where there are running Streams: the leſſer grey, which is often pyed, will do with leſs than this, though it will not thrive unleſs there be ſome Plenty.

In the Application of theſe Diſtinctions to Uſe, the Farmer muſt obſerve, that if he will have many Geeſe where there is not Abundance of Water, he ſhould chuſe the ſmall grey Kind; but when he has Water enough, let him always take Care to breed the firſt mention'd Sort, which is much the beſt.

Beſide Water, a great Advantage for the breeding of Geeſe, is a good Quantity of Common: they will on theſe Places provide for themſelves in a Manner, without the Regard or Trouble of the Owner; and it is on the common Fen Lands in Lincolnshire, and the adjacent Counties, that they keep thoſe vaſt Flocks or Droves, as they phraſe it, of them, for the Sake of their Feathers. They pull theſe in ſome Places once, in others twice a Year, and find a ready Market for their Produce. They call this ſheering of their Geeſe.

Nothing agrees ſo well with the Nature of the Gooſe as Plenty of Room, or a damp Common. They will always breed of themſelves once a Year, and in ſome Places twice, bringing up the Broods with leſs Trouble or Loſs than any other Fowl whatever.

The general and natural Time of the Gooſe's breeding is in Spring, and the earlier the better for the Owner. For this Reaſon the Farmer who keeps them about his Houſe, will do well to beſtow ſome Care and Attention upon this Head, although they would raiſe their Broods if he did not.

Some Geeſe will not lay above nine or ten Eggs, ſome will go as far as ſeventeen: they rarely exceed that Number; and if ever they do, the beſt Method is to take ſome away before they ſit. A Gooſe will very well cover fifteen, ſeventeen is the utmoſt ſhe can; and there commonly is better Huſbandry in ſetting her on fifteen; for when there are too many, they only cool one another.

There are two Reaſons why that Gooſe is beſt which lays earlieſt; the one is, that ſhe will ſit earlieſt, and the green Geeſe will be ready in the deareſt Seaſon; the other is, that ſhe has the beſt Chance for a ſecond Brood that Year. But there are Diſadvantages as well as Conveniencies in this, for the Eggs that are laid in a very cold Seaſon rarely turn out to ſo good Account as thoſe ſomewhat later.

There is an Opinion, that if the Gander treads the Gooſe on Land, the Eggs do not anſwer ſo well as when the Copulation is on the Water, and from this they attribute the frequent failing of very early Eggs, to the Waters being frozen over when the Gooſe was trod; but this is idle: the Misfortune is owing only to the Coldneſs of the Seaſon.

CHAP. XXXV.

Of the breeding and feeding of Geeſe.

WHEN the Gooſe is about laying, ſhe is ſeen to be carrying Straws about continually in her Mouth. This is for the making her Neſt; in which the Owner will do well to aſſiſt her, eſpecially in the early Broods. Let him find out for her a convenient Place warm and quiet, and let him there make her a Neſt of Straw and Nettle Roots, whoſe Smell ſhe likes; and it alſo does good to the young.

In this ſhe will lay, and when he obſerves ſhe continues upon the Neſt ſome conſiderable Time after ſhe has laid, it will ſtand as a Proof that ſhe is about to ſit.

The Gooſe ſhould be ſuffer'd to ſit upon her own Eggs, for ſhe will not do it well if ſhe perceives any Deceit in this, though they be of the ſame Kind.

The Geeſe ſucceed well enough that lay where none knows of it, yet they will be greatly aſſiſted, and the Brood from the ſame Number of Eggs, will always be larger, if the ſame Sort of Care be taken of them that is allowed to other Poultry at the Time of their ſetting.

For this Reaſon the careful Houſewife will ſee when her Gooſe riſes from the Neſt, to ſet a Quantity of proper Food before her, that ſhe may find it without Trouble; and ſome large Veſſel of Water that ſhe may waſh herſelf. The beſt Food is Bran ſcalded, or Oats; when ſhe ſets near a Pond or River, ſhe ſhould not be hinder'd from bathing herſelf, for ſhe will not ſit kindly if ſhe be not allow'd to follow Nature; and this bathing of herſelf at large is much better for her than the waſhing in any Veſſel that can be ſet; though that is a very needful Expedient where other Water is not near.

While ſhe is off the Neſt, the Houſewife will do well to turn the Eggs, if ſhe have not done it of herſelf: and when ſome hatch before the others any conſiderable Time, as they ſometimes will a Day or two, ſhe ſhould keep them in Wool, in a warm Place, till the others are hatch'd, and then give them to her with their Fellows.

The Time of a Gooſe's ſitting is from ſix and twenty to thirty Days according to the Seaſon. They generally ſit a Day or two longer in colder than in warm Weather, and ſometimes the Difference amounts to three or four.

The beſt Way of breeding up the Goſlings from the Egg is this. Let them be kept within Doors ten Days; in which Time they are to be fed with Barley Meal in Milk, or with Ground Malt, or Curds, or Bran ſcalded with Milk. After this they ſhould be ſuffer'd to go out in the middle of the Day, and at about a Fortnight old, the Gooſe ſhould be ſuffer'd to intice them to the Water.

They are thus to be tended and fed occaſionally, till they have got Strength enough to defend themſelves againſt Vermin, and are able to provide for themſelves after the Example of their Parents. For ſeveral Days after their firſt going out, they ſhould be brought into the Houſe at Night, and ſhould have ſomebody to watch them, for they are poor defenceleſs Creatures, and a Prey to every Thing; but when they are ſo far grown up as to feed well, and walk ſtoutly, they may be left without Danger to ſhift for themſelves. With leſs Care than this Broods of Geeſe will often ſucceed very tolerably; but this is no great Matter, and it in a Manner enſures their Safety.

There are two different Periods at which the Gooſe is fatten'd for the Market: Firſt, when it is very young; and, ſecondly, when it is grown. It is diſtinguiſh'd at theſe Times by two different Names; at the one, it is called the green Gooſe; and at the other, a ſtubble Gooſe. For the preparing it in the moſt advantageous Manner for either of theſe, it is to be fatten'd by a proper Manner of feeding.

The right Age for taking up the Goſling in order to fatten it for a green Gooſe, is at five Weeks; ſome take it up at a Month, and others at ſix Weeks old for this Purpoſe, and either Way does very well; but, for a general Rule, the middle Time between thoſe two is beſt. The proper Food for them is ground Malt, or Oats boil'd, given in good Plenty three Times a Day with Milk, or Milk and Water for the Drink. If they be ſhut up in a quiet dark Place they thrive the faſter; and by this Means they may be brought into excellent Condition in a Fortnight or three Weeks.

For the fattening of the ſtubble Gooſe, the ſame Method and the ſame Food are to be uſed, and in a Fortnight or three Weeks keeping, it will be ready for the Market. The taking them up ſoon after the Harveſt Seaſon, is a very favourable Time for this, becauſe in running in the ſtubble Fields, they will have got into tolerable Fleſh of themſelves; and then being kept quiet, and in the dark, and well fed with the nouriſhing Drink of Milk and Water, they ſoon fatten up to Perfection. It is a very good Cuſtom to put a little Barley Meal into their Milk and Water, and to let this ſtand conſtantly before them, which will increaſe the Power of the Food in getting them into the due Fleſh.

The natural Food of the Gooſe is principally Graſs. They will live very well upon this in Commons and waſte Places, where there grows little or nothing elſe; and thus they are to be kept during the greateſt Part of their Time. The ſtubble Fields are a great Advantage to ſuch as are to be fattened: for that Food which they pick up there from the Scatterings of the Harveſt is richer and more nouriſhing, and tends more to the Nature of that with which they are to be fed when put up for that Purpoſe. The proper Gooſe for feeding up in this Manner, is one hatch'd the foregoing Spring, that has run among the Stubble for about three Weeks: this never fails of taking to feed kindly, and grows fat ſoon.

The Proportion of the Sexes in this Kind is properly one Male to five Females. To a Flock of forty Geeſe, which is a very good Number for that Purpoſe, there are to be eight Ganders: more will be ſuperfluous, and with a ſmaller Number they will not breed to their full Advantage.

If while a Gooſe is in fattening it nauſeates its Food, and does not thrive as it ſhould, let there be ſet before it a Diſh of ſmall and clean Gravel. It will peck up this at Times, and by that Means recover its Appetite.

CHAP. XXXVI.

Of Ducks.

THE Duck is another of thoſe Fowls which Nature has deſign'd partly for the Land, and partly for the Water, but it is more of the

Water Kind than the Gooſe. It not only has Feet form'd for Swimming, but the Legs are ſo placed that it walks very indifferently, wadling as it goes, and is naturally more in the Water than on Land.

The Huſbandman who is ſenſible that the more he obſerves the Courſe and Deſign of Nature, the better he will ſucceed in all Things; will perceive from this that whether he ſhall keep Ducks, or in what Number he ſhall keep them, are Queſtions in which he muſt be determin'd altogether from the Circumſtances of his Farm.

As the Duck will be content with Puddles, he will find that he may keep ſome of them wherever there is the leaſt Water; that is to ſay, he may keep ſome Ducks every where, for he can keep no Creature without it: but where there is Plenty of Water, and roving Room upon it, 'tis there the Ducks thrive, and eſpecially where it is a running Water.

The Farmer therefore who is ſituated near a River, is beſt qualified to breed Ducks to Advantage; and although they do not come up to the Hen, Turkey, or Gooſe in Value, they have yet enough to make it very well worth his while to breed them. He is not to count the abſolute Price of any Thing alone, in order to underſtand his Profits upon it; but its Price compared with the Expence and Trouble attending it; and thus he will find the Duck of a very fair Value: for as much as its Price is leſs than that of the others, ſo much leſs is the Care or Expence needful about it: the Duck is indeed ſo hardy a Bird, that it may be left in a Manner to itſelf; and its young ſo early take to the Water, that they are out of the Way of Enemies.

The only Time in which the Duck requires any Care, is while ſhe is ſetting, becauſe then being kept from going in Search of her Food, ſhe will need to have ſome ſet before her: but at this Time the coarſeſt and moſt ordinary Kinds will do; at other Seaſons ſhe will live very well upon the ſcatter'd Corn about the Yard, the Offal of the Houſe and Kitchen, and what the Current of a running Water is continually bringing down to her. The Duck is a very general and coarſe Feeder, ſcarce any Thing comes amiſs to her; yet her Fleſh is delicate: among her good Qualities may be reckon'd this, that ſhe is leſs miſchievous than any other Fowl; and ſhe lays Abundance of Eggs which are as good as thoſe of the Hen, and hatches very numerous Broods, which are fit for the Market in the ſame Manner as the Gooſe at two Ages, when young, and when grown up: and in either Caſe they are very eaſily fatten'd.

There are ſeveral Kinds of Ducks kept in ENGLAND, but the greater Part of them for Curioſity, ſo that the induſtrious Huſbandman needs not give himſelf any Trouble about them: the two Kinds he is to regard are the common tame Duck, and the wild Duck kept tame, for this Breed will become ſo familiar from Cuſtom of ſeeing People, and being among others, that they are as manageable as the other.

Of the tame Ducks there are ſeveral Breeds, which, though they differ but in ſlight Particulars, are yet worth the Farmer's Notice as diſtinct from one another, becauſe of their different Qualities or Ways of living. In general the wild Breed require more Water, and the tame will do much better than they to be kept in the Yard almoſt entirely, as muſt be the Caſe at many Farmers. Among the tame there are theſe Differences, there is a narrow beak'd Breed, which is hardier than the common Kind, and will do with yet leſs Water; and there is a Breed that have the Beak more turning up at the End: theſe are found upon Experience to be the better Layers. They do not bring up their numerous Broods ſo well as ſome of the others, but when Eggs are the principal Conſideration, they are to be prefer'd.

The common tame Duck does the beſt in Gardens and Orchards, for there is none of them that is ſo cunning in picking up the Worms, Snails, or other Inſects, or that devours them in ſuch Quantity.

It is a very great Quantity of Eggs that may be had in the Seaſon from the Kind juſt mention'd; and ſhe will in the End ſit very well, tho' the others better. In general it is found more profitable to ſet a Hen upon the Duck Eggs, than any Kind of Duck whatever, becauſe the old one leads them when hatch'd, too ſoon to the Water; where, if the Weather be chill, ſome will be loſt. They follow the Hen a good while upon the Land, and ſo get hardy before they venture.

About thirteen Eggs is the proper Number to let a Duck ſit upon. The Hen will cover as many of theſe as of her own, and will bring them up as well, ſo that every Way ſhe is more profitable for that Purpoſe.

When the Ducklings are hatch'd, they require no Care if the Weather be tolerably good; but if they happen to be produced in a very rainy Seaſon, it is right to take them under Cover a little, eſpecially in the Nights; for, though the Duck naturally loves Water, it requires the Aſſiſtance of its Feathers, and till they are grown, is eaſily hurt by the Wet.

The fattening of Ducks at any Age is very eaſy, and whether it be the Duckling, or the grown Duck, the Method to be uſed is exactly the ſame. They are to be put into a quiet dark Place, and kept in a Pen where they are to have Plenty of Corn and Water; any Kind of Corn will do, and with this ſingle Direction, they will fatten of themſelves extreamly well in fifteen or twenty Days; and will bring a Price that very well repays their feeding.

CHAP. XXXVII.

Of the keeping of wild Water Fowl; and of Decoys.

THERE are ſeveral Water Fowl reſembling the Duck Kind, which People of Curioſity keep in ſome Places; and for which there is ſo good a Price paid in the Market when they are by any Chance brought thither, that it may be worth the Huſbandman's while, where Nature has aſſiſted in ſuiting his Situation to ſuch an Intent, to follow the Method that has been taken by thoſe who had no farther

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View, than to ſatisfy their Fancy or their own Palates in the keeping of them.

As theſe are naturally wild Fowls, they are expected to be kept wild, in a Manner, though under the Care of the Farmer; and they muſt be humour'd in this Way; they muſt have a Place of Security; and Opportunities of hiding; they muſt not be diſturbed by Peoples often going near them; and they muſt be fed as it were by Stealth.

The great Intent in all this is, to make themſelves fancy they are wild, though in Confinement. In this Manner Teal, Widgeons, and many other of thoſe Water Fowl which bear a Price in the Markets, and which few think could be bred to the Service of the Farmer, may, where he has the proper and needful Conveniences, be rais'd in a Kind of wild State, and in conſiderable Plenty.

The firſt Requiſite to this is, that there be about the Farm a Spring of Water, upon ſome level Ground, that wets a moderate Extent, and lies to ſome Depth in different Places: this anſwers excellently; and there muſt be either this, or a Part of the Arm of ſome River, or Rivulet, that the Farmer has wholly at his Diſpoſal, otherwiſe it is in vain to attempt any thing in the Matter.

Having one or other of theſe Places, let him fence it well round; plant Oziers in different Parts, and encourage the Growth of Sedge and all Sorts of Weeds in others. The great Advantage will be, to give the Fowl that are to be put into it, as many hiding Places as poſſible. The Top is to be cover'd with a Net. And when all is thus prepar'd the wild Fowl are to be put in; and being kept very quiet, they will breed and live comfortably. The Hens of the ſeveral Kinds will hide their Neſts from the Males, for they never fail to ſuck the Eggs when they can get at them: and thus conſiderable Broods will be rais'd.

Theſe will provide for themſelves in a great Meaſure: and the Food that is to be given them may be Corn of the leaſt valuable Kind: this ſhould be thrown down in two or three different Places at Night, when they are at rooſt, that they may find it in the Morning. This will accuſtom them to come to certain Places, and will give the Owner better Opportunities of knowing what is his Stock, and of taking them when he finds it convenient.

At the Times when there are young there ſhould be ſcalded Corn thrown in, which the old ones will lead the Brood to eat: there is no kind of Creature more careful of the young, than theſe Water Fowl, nor are any Birds whatſoever ſo well or ſo ſoon able to ſhift for themſelves.

This is the Contrivance for the breeding theſe Water Fowl in ſmall Numbers, and ſomewhat of kin to this is that Method practiſed in the Fen Countries, of taking them in Decoys; which yields the Owner a prodigious Advantage.

The Decoy is no other than ſuch a watery Place as we have deſcribed already well planted, of large Extent, and properly managed for the taking of ſuch wild Fowl as come into it. Nature generally has made the Place, and all that the Owner has to do is to keep every thing quiet about it. This has no Covering at Top, nor Fencing at the Sides; its Extent is ſufficient to keep its thickeſt Parts free from Annoyance, and all is to be open for the Fowls coming in. There are Nets planted in proper Parts of the Decoy, and a Number of Decoy-Ducks, as they are called, continually well fed in it. Theſe, though of the wild Breed, are in a Manner tame; they know the People and are not afraid of them; for they find they are well fed by them, and ſuffer no Hurt.

Theſe Decoy-Ducks go out at Times, and ſettling among whole Flocks of wild Ducks, they, after a little while, lead them to the Decoy, and ſwim before them into the Nets: they know they ſhall not be hurt. The People take the wild Ducks they have brought, for Market; and turn them looſe for farther Service.

CHAP. XXXVIII.

Of the Swan.

THE Swan is a leſs profitable Fowl than the meaneſt of thoſe before mentioned: and therefore, notwithſtanding the Majeſty of its Figure, and Beauty of its Appearance, is leſs worth the Farmer's Regard than any. It is kept indeed rather for Oſtentation than Uſe, and more properly belongs to the Owners of Waters than the Renters of Land. However, as it is a common Bird kept tame, and approaches to the Nature of the others, it might appear an Omiſſion not to have given ſome ſhort Account of it among the reſt of its Kin: the more, as we propoſe to inſtruct the Gentleman with the Farmer; and though our Purpoſe be to his Advantage, yet we need not deny a few Words on ſuch Things as are kept, in a Manner, ſolely for Delight. This, notwithſtanding thoſe ſeveral Diſhes that we hear of, as made from the Swan, is the principal Uſe for which that ſtately Bird is kept.

The Swan has been deſign'd by Nature, in a Manner, altogether for the Water, for it walks very awkwardly on Land: but on the Water it has great Strength, inſomuch that at Times when the Hen ſits, the Male who guards the Neſt with great Diligence, is often very furious; and at any time will defend himſelf againſt a middling Dog; and will often drown him.

Swans require a large Compaſs of Water, and do beſt upon Rivers: where there is this Opportunity the Owner will be in the right to breed them, for they are kept without Charge, and are a great Ornament to the Rivers. Neither are they ſo hurtful as thoſe imagine who have been told they deſtroy the Fiſh, for their natural Food is Graſs, and the freſh Water Weeds, that run at ſome little Depth under the Stream.

They require no more Attendance than they do feeding, but being once put on the Water will, in all Reſpects, take Care of themſelves.

Thoſe who are very tender of their Swans will give them a little Attendance while they ſit, and they

they will do the better for it, though this is not altogether neceſſary.

They muſt chuſe the Place for their Neſt themſelves, which is ſo large that it is very eaſily ſeen; and if the Owner would aſſiſt them, he is firſt to do it by planting Boughs about the Place, if not naturally ſhaded, in order to keep off the Heat of the Sun; and after this, when the ſhe ſets, he is to ſet ſome Oats in a Trough near the Neſt, that ſhe may not be induced to leave the Eggs too long in ſearch of Food.

The Swan lays from ſix or ſeven to twelve Eggs, rarely more; and her common Brood is four or five, though ſometimes more. If the Eggs hatch nearly together the Brood is the larger, if not, when there are four or five young ones hatch'd, ſhe ſets off with them; and takes no farther Notice of the Remainder. To prevent this Accident the young ones may be taken from her as they are hatch'd; and then ſhe will continue ſitting to the laſt. Theſe firſt hatch'd young may be preſerved in Wool, and all committed to her Care at laſt.

The Time of the Swan's ſetting is from ſix to ſeven Weeks, and often there will be ſome of the young hatch'd three Days before the others. Theſe, if taken from the Parent, may have ſome ſcalded Oats and Milk ſet before them the ſecond Day, and they will feed readily.

When the Brood are hatch'd they follow the Dam in the Water, and ſometimes get upon her Back; and ſhe is ſo excellent a Guardian and Provider for them, that ſhe very rarely loſes any of the Number.

Thoſe who are fond of uncommon Sorts of Food will fatten Cygnets, or young Swans, for the Table. When this is intended, the Cautions already laid down, for keeping the Swan upon her Eggs till they are all hatch'd, ſhould be carefully obſerved, that there may be a Supply, and at the ſame time a ſufficient Brood of young to grow up.

If the young Cygnet be taken out of the Water and dreſs'd, there is not ſo ill-taſted a Fowl in the World, for its Food being River Weeds, gives the Fleſh a very rank and diſagreeable Taſte; but when they are fatted for eating, they not only get a great deal more and tenderer Fleſh, but it is of a better Flavour. They are, in this Caſe, much like the fed green Gooſe, only much larger in Bulk, and coarſer in Appearance; and their Taſte a great deal ſtronger.

The Method of fattening them is this. They are to be taken from the Parent at five Weeks old, and put in Pens in a quiet darkened Place: they are here to be fed to their full Appetite with Oats, and to have Milk and Water for drink. They will fatten up in a Month, and be fit for the Table.

This is the Method of managing them for ſuch as think it worth their while to be at that Trouble, but they are not worth it for any; and as they do not bring a Price at Market, the Huſbandman has nothing to do with the Thoughts of them.

CHAP. XXXIX.

Of the Peacock.

THE Peacock is a Bird kept like the Swan, more for its Beauty than any Uſe; and conſequently it falls rather under the Conſideration of thoſe who raiſe Fowls for their Amuſement, than ſuch as are induſtrious on theſe Heads for their Advantage: there are thoſe who make this Fowl turn to ſome Account for the Table, but 'tis a Dainty, not a common marketable Proviſion; and nothing is, on this Occaſion, worth the Farmer's Regard, that he cannot regularly take to Sale.

The Peacock is therefore to be looked upon as a Bird of Fancy, not of Uſe, by the Farmer, and 'tis hardly worth his while to give it Leave to take up the Room of ſome Fowl that might anſwer his Purpoſe: for the Sake however of thoſe who ſhall chuſe to raiſe them for their Beauty, we ſhall lay down a few ſhort Obſervations on their Nature and Qualities.

The Peacock is at Land what the Swan is upon the Water, the ſtatelieſt and moſt beautiful of the feather'd Kind. It is very tender while young, but afterwards hardy enough; and as it requires little Care, and finds itſelf in Food, it may ſometimes be worth the Farmer's while who lives near a large Town, or where there may be a Demand for the Chick, by thoſe who keep them for their Beauty, to allow one Peacock and Peahen to run among his Poultry.

The Peacock is not only kept without Expence, but he is uſeful to the Owner in his feeding. He not only provides for himſelf, but rids the Ground of Vermine, in that Article, for his Food is Efts, Toads, and Snakes. He will eat Corn when he can get it, but this is his common Diet.

The Peahen will make her Neſt in Thickets and Buſhes; and ſhe takes all poſſible Care to hide it from the Cock, for he in this, as in many other Kinds, will deſtroy the Eggs if he can find them.

When the Peahen has ſet herſelf, it will be proper to put ſome Corn and ſome Water near her, that ſhe may not be under a Neceſſity of leaving her Eggs to chill, while ſhe is ſeeking at a Diſtance for Food.

The Time of her ſitting is thirty Days, and as the Chicks are very tender when firſt hatch'd, they muſt be houſed for ſome Days, the Cold ſoon killing them. During this Time they are to be fed with freſh Cheeſe, or with Barley Meal and Water. They muſt be let out in the Middle of the Day, and taken in again at Night, for ſeveral Days, and when they have, by this feeding and Management, got ſome Strength and Bigneſs, they are to be truſted out with the Dam, and then no farther Care need be taken of them. The Cock ſeems not to own them till the Feathers that form the Coronet upon their Heads begin to riſe; but after this he is as fond of them as the Hen, and will call them about him to feed, providing for and defending them with great Care.

From the Time of their going at large with the Hen, they need no more Care of feeding or

Attendance, except any one has a Mind to fatten them for the Table. If this be done, the uſual Time is when they have arrived at about half their Growth, and they are then put in a Pen, in a dark quiet Place, and fed with any Kind of Corn as much as they will eat, and have Plenty of freſh Water. Quiet, and Plenty of Food will thus make them fat in about a Month's Time, and their Fleſh will be better taſted than when they run at large, and take their natural and coarſe Meat; but at beſt they are inferior to almoſt any Kind of Fowl, and have a very ſtrange, raw, and bloody Appearance, when they have been ſet by for a Night after Dreſſing.

CHAP. XL.

Of the Pheaſant.

THE Pheaſant, though naturally a wild Bird of the Woods, is much of the common Poultry Kind, and may be bred in the ſame Manner in proper Places erected and contrived for that Purpoſe: but as this is an Article in the Way of the Gentleman rather than the Farmer, we ſhall not detain our induſtrious Reader with any long Diſcourſe on the Subject.

There are Pheaſantries in many Parts of England, where Numbers are annually bred, and grow up; but there requires a great deal of Care about them when young; and a Regard to their Danger from Kites, Hawks, and other Birds of Prey at all Times; for the Pheaſant is of all Fowls the delicate and favourite Bit with theſe Devourers.

The rooſting Places are to be well defended for this Reaſon, and the Fence is to be high to prevent their Eſcape. They lay freely, and bring out large Broods, but ſeveral die in ſpite of all poſſible Care in the raiſing; however, with good Diligence, a Number of them may be rear'd.

The natural Food of the young Pheaſant is that white Subſtance called the Ants Egg. The old ones in their wild State lead them to the Ant Hills in the Woods for this, and they muſt be ſupply'd with it in Abundance by the Induſtry of the Keeper, when bred tame, otherwiſe they droop and come to nothing; this occaſions a great deal of Trouble at firſt with them, but after that they will be train'd up with great Eaſe, for they will eat any Kind of Corn, and they are not tender or difficult to raiſe.

CHAP. XLI.

Of Pigeons.

WE come now to treat of a Fowl ſmaller in its Size than any of the before mention'd Kinds, but ſuperior to many of them in Value; the Pigeon. The Management of this Bird is alſo different in a great Meaſure from that of the others, ſo that it naturally falls under Conſideration ſingly. But there is no one of all thoſe Kinds about which ſo much Care is generally taken, that is more worthy of the Notice and Attention of the prudent Huſbandman.

It is a great Recommendation of any Creature to the Farmer, that it will be kept at ſmall Expence, and this is the Caſe with the Pigeon, which he ſhould keep; for there are ſome Kinds that require a great deal of Food and Charge: the proper Pigeon for the Dovecoat, which is the only Kind he is to regard, is able the greateſt Part of the Year to provide for itſelf; and when it requires his Aſſiſtance, the Food is not of any dear Kind. Beſide the common Advantages of the Breed, there is that great Article their Dung, which we have treated of in its Place; and which we have ſhewn to be of ſuch great Service as Manure, that it muſt be the Intereſt of every Farmer to provide it for his own Uſe, eſpecially as that is to be done with great Eaſe, and the ſame Method that affords it will yield him alſo a great many other Advantages.

There are at this Time many Kinds of Pigeons kept in England, by People fond of Curioſity, and it has become a Study to procure and raiſe new Kinds among thoſe who are called Pigeon-fanciers, as much as to get from Abroad, or raiſe from Seed, new Kinds of Carnations or Auricula's among the Floriſts. But with this the induſtrious Huſbandman has nothing to do. He is to keep Pigeons for their Value, not their Beauty; and he is to conſider which may be kept with moſt Eaſe, which is in his Way one of the greateſt of Recommendations to any Thing.

Not to enter into the nice Diſtinctions of the Kinds which are of late Years become endleſs and innumerable, we may ſay in general that there are two Sorts; the tame, and dovecoat Pigeon. The tame Pigeon is valued not only for his Beauty, but for the Largeneſs of its Body; the common Pigeon, which is the Kind uſually kept in Dovecoats, and thence called the dovecoat Pigeon, is ſmaller, and leſs beautiful.

The tame Kind generally have but two young ones at a Brood; but they make ſome Amends for the Smallneſs of the Number by the frequency of their hatching; for, if well fed and tended, they will have young ones every Month.

For the Choice of theſe the Beauty is generally moſt regarded; but there ſhould be Care taken to pair them well, and this is the more worth while becauſe they are not apt to ſeparate afterwards.

They muſt be kept clean, for they hate Dirt, though they make a great deal of it. But their Food is ſo dear, that few but thoſe who know very well how to manage them care to meddle with them. Their beſt Food is Tares or white Peaſe, and they ſhould have beſide this ſome Gravel ſcatter'd about, and clean Water at all Times: and a great deal of Care muſt be taken to preſerve them from Vermin, and their Eggs from the Starlings and other Birds, which always haunt the Places where they are kept, in order to ſuck them.

In order to the perfect Thriving of theſe Pigeons, it will be proper, beſide their Food, Gravel, and Water, always to let there be ſome Salt, Clay, or ſome other Thing with Sea Salt in it, for them to peck at their Pleaſure.

We have ſaid thus much with reſpect to the Management of the tame Pigeon, for the Information of ſuch as may chuſe to breed them, and have not had Opportunities of ſeeing it done; and it will

will be proper to add here, that although the Expence and Trouble they occaſion, be more than is worth the Huſbandman's while in general to give himſelf; yet there is this Advantage, that their Dung is richer than that of the common Pigeon as a Manure: this is owing to their Food, as has been explain'd at large in its proper Place.

After this ſhort Account of the tame, we come to the Conſideration and Management of the common or dovecoat Pigeon, which is a Subject that demands, and deſerves the Huſbandman's utmoſt Regard.

The keeping of Pigeons is a great Advantage to every Farmer that may do it; and they bring in a great Profit for a very ſmall Expence in all Places; but they thrive beſt in open Countries, becauſe there is uſually moſt Corn there, and they feed with leſs Danger, the Hedges in encloſed Places ſheltering People while they ſhoot them.

There are ſome Counties where the Huſbandmen ſow great Quantities of Horſe Beans and grey Peaſe, and in theſe particularly the Pigeons feed to a great Advantage. Theſe Sorts of Pulſe are ſow'd earlier than other Kinds of Grain; and their early feeding upon them makes them healthful and ſtout at thoſe Times, and is an Occaſion of their breeding earlier than they do elſewhere, which is a Conſideration of great Importance.

The common blue Pigeon is properly the dovecoat Breed; and it has the Advantage of many other Kinds in that it is hardier, and will live in the worſt Winters.

If it be too ſmall for the Farmer's Purpoſe, he may mend the Breed by putting in a few tame Pigeons of the moſt common Kind, and the leaſt conſpicuous in their Colours, that the reſt may the better take to them by finding them more like themſelves; this, however, is to be done with Caution, and never without a due Conſideration; for though the Bigneſs of a Pigeon's Body is a plain Advantage, yet it is very well known in the Kinds in general, that the ſmalleſt body'd are the beſt Breeders.

The Ringdove has been by ſome introduced into the Dovecoat, by ſetting the Eggs under a common Pigeon; they will in this Caſe live, and take their Chance among the Pigeons; and they have two Advantages over them, the one in their Largeneſs, and the other in their Hardyneſs; for they will endure any Weather, and live upon any Food.

The Huſbandman ſhould have a very careful Eye upon the Proportion of the Sexes among his Pigeons; for there is nothing ſo hurtful as the having too many Cocks, eſpecially if they keep the larger or tame Kind. It is his Buſineſs to keep his Dovecoat well ſtock'd; and moſt People who keep them make their Conſciences eaſy about deluding away thoſe belonging to their Neighbours; but this Abundance of Cocks thins the Dovecoat, for they grow quarrelſome, and will beat others away; till by Degrees a very thriving Dovecoat ſhall be by this ſingle Miſtake reduced to a poor Condition.

A very cheap and eaſy Way of making a Dovecoat is to build the Walls with Clay mix'd with Straw, they may be made four Foot or more in Thickneſs, and while they are wet it is eaſy to cut Holes in them with a Chiſſel or other Inſtrument.

This Kind of Dovecoat, beſide its Cheapneſs, has the Advantage of great Warmth, and no Building agrees better with the Pigeons. A Dovecoat of this Kind of four Yards ſquare in the Clear, may be built for about Five Pounds.

The Holes ſhould be made about fourteen Inches deep, and a little dipping backward: The Reverend Mr. LAWRENCE who uſed this Method of building his Dovecoat, ſays, That the Pigeons proſper'd in it better than in any Brick or Stone Building he had ſeen.

Of whatever Materials the Coat be erected, it ſhould be white-waſh'd frequently on the Outſide. The Pigeon, as has been ſaid already, is a cleanly Bird: it loves the Appearance of Neatneſs; and beſide the white Colour renders the Building more conſpicuous.

As to the Food of Pigeons, beſide the Peaſe and Tares already mention'd, Barley is very proper, heartening them very much, and makeing them lay; and for the ſame Purpoſe Buckwheat alſo is an excellent as well as cheap Food.

For the greateſt Part of the Year however, the common Pigeons in a Dovecoat take Care of themſelves, and need no Food from their Keeper. There are only two Seaſons at which it is neceſſary or proper to feed them: One of theſe Times is the Depth of Winter, when the Ground is cover'd with Snow, or harden'd ſo by Froſt, that nothing is to be got; and the other is, the middle or latter End of JUNE.

The Reaſon of feeding them in the firſt of theſe Seaſons is obvious; the latter, the Farmers when they ſpeak of this Fowl call benting Time. There is a Graſs called bent Graſs, the Seed of which is ripe about this Seaſon, and is the only Food of that Kind the Pigeons can eaſily get, the Peaſe being not yet ripe. This is a very poor Food, and the Pigeons at this Seaſon uſually have many young Broods; ſo that they will be ſtarv'd if they are left to this poor Diet; and the Farmer will always find his Account in giving them Food at this Seaſon, as well as at the other. This laſts however but a ſmall Time; and the other is only neceſſary at the ſevereſt Days of Winter; ſo that the Pigeon is at the utmoſt but a ſmall Expence; and that for a very ſhort Time.

Beſide the Food, the Breeder of tame Pigeons has been adviſed to give them a Lump of ſalted Clay, and the ſame Indulgence muſt be ſhewn to theſe. But as they are more numerous, there is to be a larger Allowance. A large Heap of Clay ſhould be laid near the Dovecoat, and the Brine of the Family continually beaten in among it. Another Way is to make a Kind of Mortar with Lime, Sand, Clay and Salt, which they will peck with great Satisfaction. The Pigeons themſelves have pointed out this Method, for they are continually pecking at the Joints of Walls to get out the Mortar. When it is thus made on Purpoſe for them, it is beſt to make it thin, and keep it ſo by often beating it up with Brine.

In ſome Places they lay what is called a Salt

Cat, near the Dovecoat. This is a large Lump of Salt made for the Purpoſe at the Salt Pans; and is the Method commonly taken where there are Works in the Neighbourhood, but the Way of uſing Salt in a Mixture with Clay is better.

What I have found by Experience to anſwer beſt of all is this. A Heap of Loam is to be laid near the Dovecoat, and beat up to a Kind of Pap with Brine or Water; into this is to be thrown a large Quantity of Bay Salt, and a little Saltpetre, and with it a Shovel full or two of large coarſe Sand. When Brine is uſed to beat up the Loam, leſs Salt is to be uſed; and when Water, there muſt be the more of it in Proportion. And in the ſame Manner if the Loam contain a great deal of Sand, the leſs is to be added to it; and if it contain leſs, the more is to be given. Where Loam is not to be had Clay will do, but then a much larger Quantity of Sand muſt be put in; and the beſt Sand for this Purpoſe is large coarſe Sea Sand, which is already impregnated with Salt Water; or that which is got in ſcreening of Gravel.

It is a very ſingular Thing that the Pigeon loves Salt in this Manner; and its Fondneſs for Saltpetre, which is very great, is not ſo well known; though this might have been diſcovered by obſerving the liking this Bird has to the Mortar in old Walls, which contains a Salt very nearly ally'd to the common Saltpetre.

Salt is not only uſeful in this Manner to pleaſe the Pigeons, when they are in Health, but nothing recovers them ſo readily from Sickneſs. A Mixture of Bay Salt and Cummin Seed being with them an univerſal Remedy.

A great many Contrivances have been publiſh'd; and many more are handed about among the Country People as great Secrets, for the making the Pigeons love their Habitation, and tempting ſuch Stragglers from their Neighbours as chance to come to the Coat to ſettle in it. Some have adviſed the Uſe of Aſſafœtida, and others of Cummin Seed before mention'd for this Purpoſe; but the beſt Method of all others is to keep up conſtantly ſuch a Heap of ſalted Loam as I have before deſcrib'd; this is what they love, and they will therefore ſtay where they can have it in Plenty. This Contrivance, with the Addition of keeping the Dovecoat neat and clean, and not ſuffering them to be diſturbed in it, will be ſure to keep the Stock in good Number, and too likely to increaſe it at the Expence of the Neighbours.

The Profit of Pigeons is very conſiderable, and very certain; for they breed faſt, and there is a conſtant Demand for them. Near great Towns it may be worth while to keep ſome of the large tame Kind; becauſe, although they cannot be fed but at a large Expence, yet their young come ſo early, and are ſo fat and fine, that they command a Price, which very well returns it: but in the Country the common Pigeon is the proper Kind; for though the Price that the Birds fetch is not nearly ſo great, their Number, and ſmall Expence of keeping, very well make Amends.

Among the Methods which are recommended for the drawing Pigeons to a deſerted Dovecoat, one of the moſt ridiculous is that of a baked Bitch. This is perform'd with great Ceremony: the Creature is to be killed at the Time ſhe is proud, or ſalt, and then flead, baked, and laid in the Dovecoat. Some improve upon the Practice, by putting Cummin Seed in the Belly: for the Pigeon is really fond of the odd Smell of this Seed, which is the moſt diſagreeable of all thoſe called Aromatick. This may therefore have ſome Effect; the other can have none; and yet the wonderful Powers of it have been recorded by many Authors. The plain Account of this is, that a Dovecoat has been deſerted becauſe of its Dirt and Naſtyneſs; and they have cleaned it out, and laid the baked Bitch in it: The Effect of the Cleaning they have laid to the Carcaſs of the Animal: for it is not the Countryman alone who miſtakes Cauſes.

I have ſpoke often to the Farmers to recommend their ſetting up of Dovecoats, but have found it in nothing ſo difficult to make them liſten to me. While they have bought Pigeons Dung at a great Price, and fetch'd it from a great Diſtance, they have ſtill been backward to think of keeping Pigeons themſelves for their own Supply. There is a Superſtition among them, that it is unlucky to ſet up a new Dovecoat; this has come down from Father to Son, and they perſuade themſelves it would certainly be follow'd by Death in the Family. Nothing can be ſo ridiculous, or ſo weak, as ſuch a Suppoſition; but there never was an old Woman's Tale ſo deeply rooted.

BOOK V. PART III.

Of FISH.

CHAP. XLII.

Of the Advantages of Fiſh Ponds.

FISH are not conſider'd ſo much as they ought, either by the Huſbandman himſelf, or by others, as a Part of his Stock; but we ſhall endeavour to ſhew from Experience, that it is as eaſy for him to manage theſe as any other of the already mention'd Creatures, and that the Profits ariſing from them are very well worth his Attention.

We are here treating of thoſe Animals which he may keep upon his Farm, or in his Grounds, and Fiſh are very plainly of that Number. He muſt have ſome Water, and he may, according to the Situation of his Farm, have a great deal.

Fiſh will live in this, and he may have a reaſonable Profit in all Caſes, and in many a very large one.

One Kind of Fiſh will live in one Sort of Water, and another Kind in another. There is ſome Species that will live in all; and he who has Water, and leaves it unoccupied by them, defrauds himſelf of a Part of his natural Advantages, as much as if he were to omit to put Stock into his Paſtures.

But there is a farther Conſideration yet in the Reach of the prudent and induſtrious Huſbandman. Whereſoever there is Water we ſee Fiſh will live: it is not only his Intereſt at all Times to put a Stock of them into Ponds, when he has them; but it may be very often worth his while to make them for this Purpoſe.

I have labour'd throughout this Work to put the Farmer in a Way of making the moſt Advantage from every Part of his Land; and have propoſed in the Plan of it to conſider in what Inſtances Art may, for his Service, come in to the Aſſiſtance of Nature; and in particular, how Pits may be converted into Fiſh Ponds.

I ſhall here enter into that Conſideration a little farther, and endeavour to ſhew, not only how he may ſtock whatever Water he has with Fiſh that is fit for that Purpoſe; and how render that in ſome Caſes proper for their Reception, which was before from ſome Circumſtance or Accident unfit for that Uſe; but in what Caſe it may be to his Advantage how to dig Ponds purpoſely for this Uſe.

There may be Parts of his Ground, which from their Nature and Situation will yield him little Advantage any Way elſe, and which may be converted to this Uſe with conſiderable Benefit. In this Caſe I ſhall adviſe him to put them to that Uſe, though at ſome Expence; and ſhall lay down the moſt advantageous Method of doing it. The Lands on which it may be proper and advantageous for the Huſbandman to make Fiſh Ponds, are of two Kinds; thoſe which are boggy, or naturally watery; and thoſe which although dry and firm, lie in the Bottoms between riſing Grounds. Theſe are to be ſelected for two different Reaſons; thoſe of the firſt Kind becauſe they are either fit for little elſe, or can no Way be made ſo uſeful; and thoſe of the ſecond, becauſe they will anſwer a double Purpoſe, the watering of Cattle, and the breeding of Fiſh. Theſe will be ſupplied by the Waters from the riſing Grounds, and will in this Uſe bring a great Profit, as well as great Convenience.

We are to remember in this Place, that we write to the Gentleman as well as to the Farmer: in that Light we may name the Supply of the Table from theſe Ponds as a very great Article; for all that is ſaved in Expence is got: and the Addition of good Fiſh in Plenty is a Conſideration of great Value to the Table of a Perſon of Fortune. The Farmer is only to conſider the Demand at Market; but this is abundantly enough to anſwer his Purpoſe. He will hardly deny himſelf the Produce of his Waters at his own Table; but 'tis not in that Caſe to be regarded as an Article of Profit, for Fiſh are not the Food for a Family.

When the Ground is fixed upon for the makeing a Fiſh Pond, let the Undertaker conſider, whether it have Springs to feed it, or muſt depend altogether on the Rains: for this makes a very different Management neceſſary. Ponds that have Springs will be ſafe from drying on an entire Flat: but there ſhould be a Deſcent to thoſe which are to ſupport themſelves by Rains, for without this they will fail at Times; and the drying up of a Fiſh Pond is a terrible Stroke upon the Owner.

When Flags and Ruſhes grow on a low Piece of Ground, 'tis a Proof there is Water near. We have ſhewn already of how little Value the natural Products of ſuch Lands are, and have laid down the Methods of improving them by Culture: let the Huſbandman conſider the Expence and Profits either Way, together with his own Occaſions for Water, and the Extent of the Ground; and then determine what Courſe to take to render it the moſt uſeful, and obtain from it the largeſt Profit.

On the other hand, in thoſe Grounds which lie between Hills, Ponds will have the Advantage of what is waſh'd from the riſing Grounds by the Rains. They will feed Fiſh, water Cattle; and alſo afford from their Bottoms a Manure of the greateſt Conſequence to the Farmer.

The Water that runs in wet Seaſons from the Hills, does not go off pure Rain: it waſhes away with it the lighteſt and richeſt Parts of the Soil, and alſo the fineſt Part of the Manures and Dreſſings the Huſbandman had laid on his Grounds. This enriches the Water, and feeds and ſupports the Fiſh in a ſurprizing Manner; and after all it is not loſt. The having Ponds in theſe Places is the true Way of ſaving it. All runs into them with the Water, and ſettles to their Bottom after a Time; and is finally left there. This is the Occaſion that Ponds ſituated ſo as to receive the Water from high Lands fill up ſo ſoon, but that is no Diſadvantage to the Owner; on the contrary, it is a laſting Source of Manure, and a great Benefit. Theſe Ponds are eaſily cleaned, and this Mud many Times over pays the Expence of the Work. In this Caſe it is proper that Proviſion ſhould be made for receiving the Fiſh during the cleaning of the Pond: the Perſon who thus foreſees the ſeveral Advantages of what he is about to undertake, will ſet about it with the more Spirit, and will contrive accordingly.

The Neceſſity of cleaning Ponds is abſolute, but ſo alſo is the Advantage attending it. The Time is very different according to their Situation. Ponds in an even Ground, that are fed by Springs, need not be ſcoured above once in fifteen Years; but thoſe which receive theſe rich Waters from Hills, ſometimes require it every four or five Years. And the others in Proportion, according as they partake more of the Nature of one of theſe or the other.

We have in ſeveral of the preceeding Articles of the Farmer's Stock, reminded him of the great Value of thoſe Creatures which are kept at a little Expence; this is no where to be more conſidered than here; for the firſt Expence is all. Many Creatures are to be kept at a little

Charge, as they in a great Meaſure provide for themſelves; but Fiſh entail no Expence upon their Owner at all, for they will do this entirely.

We ſhall hereafter obſerve, that it may be ſometimes worth while to throw into a Pond where Fiſh are feeding, ſome Things of very little Price, but even this is not neceſſary. The Fiſh of Prey are to be ſupplied by firſt ſtocking the Ponds with Roach, and the like Fiſh, which are of ſo little worth, that they are fit for nothing elſe; and are ſo numerous, that they may be often drawn up in a Net by Buſhels: for the reſt, Grains, or Refuſe of the like Kind, is all that can be given them.

Having ſhewn theſe Advantages of Fiſh Ponds properly ſituated, we ſhall in the next Chapter proceed to lay down the Methods of makeing them moſt advantageouſly, and with leaſt Expence.

CHAP. XLIII.

Of the making of Fiſh Ponds.

WHoſoever propoſes to make a conſiderable Advantage from Fiſh Ponds, muſt have ſeveral of them. He muſt have ſome to receive the Fiſh of thoſe which are cleaning; and he muſt have ſome for one Kind, and others for another. He who ſhould put his Fiſh of Prey and his others together, would find a very ſorry Account in the End.

There is a farther Conſideration alſo, which demands that there ſhould be a Number of Ponds; this is that they are intended for different Uſes. Some are for breeding, and others for feeding of the Fiſh. There ſhould be a diſtinct Pond for the Pearch, and another for the Carp and Tench; but he muſt have one Pond for his Carp to breed, and another for them to feed in; for Experience ſhews thoſe who never trouble themſelves about the Reaſons of Things, that in thoſe Ponds where Carp breed, they feed very poorly; and, on the contrary, in thoſe Ponds where they feed well, they ſcarce breed at all.

In general, Fiſh Ponds may be divided into two Kinds, ſuch as have ſharp and clear Water, and ſuch as have it ſoft and thick. The firſt of theſe are the Ponds for breeding, but the others are thoſe for feeding.

This may direct the Undertaker in general in his Work, and we ſhall in their Place add more Obſervations on this Head: from what has been ſaid of the Number and Variety of his Ponds, and their appropriated Uſes, he will the better conceive what is meant in every Particular of thoſe Directions we are about to give for the digging and conducting of them.

The beſt Method of all where the Ground and other Accidents concur to favour the Intention, is to have a String or Row of Ponds, where there is at the upper End a ſmall feeding Spring for the Supply of the whole, ſo that in dry Seaſons they may be ſure to be kept up with a due Quantity of Water; and there ſhould be alſo Contrivances for letting off the uſeleſs or abundant Water from them, that they may not be overflow'd.

At the Head of every Pond there ſhould be a Sluice, and this Head muſt be made in the loweſt Part of the Ground. A great deal depends upon the proper Structure of the Head, and Contrivance of the Sluice. The Head muſt be very firm and ſound, or it may give Way, and deſtroy the whole Work; and the Sluice ſhould be ſo made, that the Water may, upon Occaſion, be let off very freely and quickly: the great Care that ſhould be taken on this Head is, that there be a ſufficient Fall from the Sluice, for on this the Quickneſs of the Waters running off will depend, more than on any other Conſideration whatſoever.

In order to ſet about making the Head of the Pond, a proper Quantity of ſtrong Stakes are to be provided. They ſhould be of about ſix Foot long, ſtrait, thick, and of ſuch a Wood as will bear the Dampneſs of the Soil. For this, Directions have been given already in our fourth Book; where the Reader will find an Account of the ſeveral Natures of the Species of Timber, and the Purpoſes to which they are ſuited: ſo that he is to ſelect among the ſeveral Kinds that will anſwer this Purpoſe, that which he has moſt at his Command, or can ſupply himſelf withal moſt conveniently.

The Stakes being ready, let him ſet about his Work by driving them firmly into the Ground in three Rows, at four Foot Diſtance Row from Row, and about three Foot ſeverally in each Row. Theſe Rows muſt be carried the whole Length of the Pond Head; and the firſt Row muſt be driven four Foot into the Ground.

This is a very ſufficient Preparation for the Superſtructure, where the Ground is tolerably firm; but in Places where it is looſe and ſandy, it is a very good Method as ſoon as the Stakes are rammed, to pour in a good Quantity of Lime. This will ſlake gradually with the Wet, and mixing with the Sand, will become of itſelf a Kind of very firm Mortar, binding all about the Stakes in the Manner of a Stone.

When the Soil is not abſolutely ſandy, and yet is not ſo firm as might be wiſh'd, it is a good Way at firſt to put a Layer of Earth, and a Layer of Lime, and ſo work up the Foundation.

When the Stakes are thus driven, and the Ground is ſecured, let the Workmen begin to dig the Pond, whether that be to be done entirely, or Nature only to be aſſiſted in it.

Let the Earth they dig be thrown among the Stakes, and rammed well down, and thus laid in till they have entirely covered the Earth, being raiſed in a Bank above the Level of their Tops.

Another Parcel of Stakes are now to be driven in the ſame Manner as the firſt, and in the Interſtices between them; and the Earth that is dug is to be again laid in among theſe; and ſo, if needful, a third Parcel are to be driven, and filled up in the ſame Manner with the Earth that is dug. The Nature of the Situation is to determine this, and the Expence will be proportion'd to the making of this Head in Height.

This Head or Bank is not to be rais'd perpendicular, and all of a Thickneſs throughout; but ſloping upwards on each Side, in the Manner of thoſe Banks we have before directed to be made for the ſecuring Lands from the overflowings of the Sea. It is to be thickeſt at the Bottom, and ſmaller all the Way up: and the Slant on the Inſide muſt be made very ſmooth and even.

When it is thus carry'd up to a due Height, and the Sluice fix'd, and there is a Convenience for carrying off the waſte Water in Time of Floods, it is finiſh'd; and the reſt of the Work is cheap and eaſy. The whole String of Ponds are to be fabricated in this Manner, and they will always be managed afterwards with Eaſe and Convenience. It will alſo be a great Addition to the Work if a Side Ditch be dug, with Sluices out of each to it, for the emptying them ſeparately. For by this Contrivance any one of the Pond, may be emptied without diſturbing the others. This is a Contrivance we find mentioned by Dr. PLOT, as practiſed at STANTON HARCOURT, in OXFORDSHIRE; and it is ſo rational, that it muſt be well worth while to follow it in other Places.

The Head being made, we are to conſider the Conſtruction of the Body of the Pond. As to its Size, that muſt be proportioned either to the Nature of the Ground, or to the Quantity of Fiſh intended to be kept in it. But whatſoever be its Bigneſs, there are ſome unvariable Rules to be obſerved in its Conſtruction.

The Depth is a very material Article: for there are great Inconveniences attending the making it too deep or too ſhallow; and one Reaſon of the ill Succeſs of Fiſh Ponds in ſome Places is, that the Owners have taken them juſt as they found them, and ſome are too deep and others too ſhallow. A Clay Pit, or a Gravel Pit, may be capable of being converted into a Fiſh Pond; but he would be very idle who ſhould take them for that Purpoſe juſt as he finds them, and expect as much Advantage as if they were better form'd.

The proper Depth of a Fiſh Pond is about ſix Foot. It may be ſomething deeper without Diſadvantage, but no Pond ſhould be contrived to be of a leſs Depth than this, at middling Fullneſs.

We have obſerved already that the Ponds are to be of two Kinds, according to the Nature of their Water, the one for breeding, and the other for feeding of the Fiſh; and that this depends upon the Quality of the Water; the pooreſt being fit for breeding, and that which is moſt enriched by Additions, for feeding.

Therefore, ſuppoſing theſe Ponds to be all ſupplied by one original Spring riſing above the firſt; running through that, and thence into the others; it is plain that the Water of this Spring will be clearer, ſharper, and purer in the firſt Pond, into which it is received immediately from the Source, than in thoſe others into which it runs through that, and ſucceſſively through one or more of them alſo. Therefore in ſuch a ſtring of Ponds, the firſt or higheſt will always be fitteſt for a breeding Pond; and the laſt or loweſt fitteſt of all for a feeding Pond; and ſo of the reſt proportionally, thoſe will be fitteſt for breeding which are neareſt the firſt, and thoſe for feeding which are neareſt the other, or loweſt. This is a very material Diſtinction, for there ſhould be a Difference in the Conſtruction of the ſeveral Ponds, according to the Purpoſes for which they are intended.

One breeding Pond is enough to ſupply ſeveral for feeding: ſo that, in general, under ſuch a Diſtribution of Ponds in a Row, as thoſe here deſcribed, the proper Method will be to keep the firſt, or that which immediately receives the Spring, for breeding, and the ſeveral others that come next after it, for the Pike, Perch, and other Fiſh of Prey; and only the two or three laſt for feeding; which will receive their Water enrich'd by what it has collected in paſſing through the ſeveral others.

According to this Diſtribution, the firſt Pond ſhould be the leaſt deep of all: and ſhould have ſome Places particularly ſhallow, and contrived on Purpoſe for the receiving the Spawn. Its general Depth ſhould be five Foot; juſt at the Head it may be, for a little Way, five and a half, or ſix Foot; and the Head itſelf ſhould be carried down with a gentle Deſcent into that Depth, and toward the Water's Edge bottom'd with a clean Gravel. The Sides ſhould alſo, in moſt Places, go down with a very gradual Deſcent, and here and there be extended in Shoals, ſome of which ſhould have Stones and Gravel thrown over the Bottom; and the others left naturally. Theſe ſhallow Places ſerve for the Fiſh to ſun themſelves upon; and they lay the Spawn upon them, which in thoſe Places receives the Influence of the Sun, and is aſſiſted by it in the hatching into Life.

In general, Ponds that have a clean Water, and a gravelly or ſandy Bottom, are the beſt for breeding; as thoſe which have a ſoft or muddy Bottom are for feeding: and as this is known to ſucceed beſt in Nature, this is what Art ſhould imitate.

The middle Ponds, in this String of them, ſhould be of a ſomewhat greater Depth than the others, that the Pike, which grow large, may have a ſufficient Scope of Water; all Fiſhes naturally requiring this in proportion to their Magnitude. But it will be convenient alſo in theſe to let the Head deſcend gradually, and to have Shallows purpoſely left in ſome Places, as was directed in the breeding Ponds. Theſe will not only breed there themſelves, but their Food the Roach, and other ſuch Fiſh ſhould be encouraged to breed alſo. This they will do on theſe Shallows purpoſely left, and in this Manner ſuch a Supply will be rais'd, that the Pike and Pearch will find their Food naturally provided.

Laſtly, thoſe Ponds intended for feeding Carp, and ſuch other Fiſh, which are to be at the lower Part of the Row, ſhould have the common Depth of ſix Foot, in a Manner throughout; but it will be very proper to have here and there a little Iſland ſtanding in theſe; and in other Places to hollow away the Banks underneath, and to plant Willows, and other watery Trees along the Edges, that their Roots may bulge out into the Water. All theſe will ſerve to give Shelter and hiding Places to the

the Fiſh, without which they will never thrive as they ought to do. Theſe Contrivances are very proper alſo for the middle Ponds in which the Fiſh of Prey are kept, for they love Holes and ſkulking Places more than any other: but in the breeding Ponds they are leaſt needed. Though in Moderation, Shade and Shelter are convenient every where. It is a very good Practice to ſink ſome ſmall Faggots in different Parts of the Ponds, when new dug, for they will ſerve the ſame Purpoſe of ſheltering, till ſome Weeds riſe in their Bottoms.

In all theſe Things the great Rule is Moderation. If too many Trees be planted on the Banks, they do a great deal of Harm by the falling of their Leaves into the Water; and too many, or too large Iſlands left in the Ponds, take up too much Room.

CHAP. XLIV.

Of the ſtocking of Fiſh Ponds.

WE have obſerved that our Huſbandman, who makes Ponds for the Sake of the Profit he is to gather from them, is to diſpoſe them in a Row, and form them according to the ſeveral Purpoſes they are to anſwer. We are to ſuppoſe him thus far advanced in his Deſign. He has, we will ſuppoſe, eight of them in this String, and has contrived the firſt for breeding of Carp and Tench, the ſecond for breeding Pearch, the two laſt for feeding his Carp and Tench, and the four middle ones for feeding his Pike and Pearch ſeparately, according to his Diſcretion.

The Ponds are prepared, and he is to ſtock them. The four Kinds already named are the Principal that he is to regard. Trout will not thrive in ſtanding Waters; in many they will not live, and in thoſe where they do not die at once, they languiſh and have nothing of their true Flavour.

Eels are very well worth keeping in Ponds, but they need not have any kept on Purpoſe for them. They are a Fiſh of Prey like the Pike and Pearch, and they may be kept in the ſame Pond with either, for they hide themſelves in ſuch a Manner, that thoſe Devourers cannot get at them: and they will thrive upon the ſmall Fry that are kept there for the Support of the others. They will grow to a great Size in theſe Ponds, but they are not like the Eel of the River for Taſte. The fineſt Eels in the World are thoſe caught in the clear and ſhallow Trout Rivers: theſe in Ponds have neither their Flavour at the Table, nor their Look while living.

Some put their Pike and Pearch into the ſame Ponds, imagining that the Pearch will eſcape the Jaws of the Pike, becauſe of his hard Scales, and prickly Fins, but this is a Miſtake. Where there is Plenty of other Food the Pike will let the Pearch eſcape, becauſe he prefers the Roach to him; but when Hunger calls upon that Fiſh, he is not nice in his Diſtinctions.

Some keep Fiſh of other Kinds in Ponds, as Chubs, Bream, Flounders, and the like, but they anſwer no profitable or uſeful Purpoſe. Where Fiſh are kept for the Table only, theſe are of an inferior Kind; and where the Price they will bring at Market is ſtudied, they are nothing in Compariſon of the others. A Bream is not good for any thing till it is of a very large Size, and it will never grow to this under fifteen or twenty Years, and requires very deep Water: and when it is at its Perfection few know that it is good; and 'tis not the pleaſant but the faſhionable Diſh, that brings the Money. If Gudgeons are kept it muſt be in the firſt Pond, where the Water is pureſt and cleareſt, but they come to nothing there; they are like the Trout, a Fiſh that naturally live in ſwift and ſhallow Rivers, and in Ponds they loſe their Colour and their Flavour.

Theſe Conſiderations fix the Huſbandman to the five Kinds of Fiſh already named, as the principal for his Purpoſe, and we have ſhewn in what Manner theſe are to be diſtributed in his Ponds. We now come to give him ſome Directions, ſuch as the concurrent Experience of all who have try'd confirms, for the breeding, feeding, and preſerving them in the moſt profitable Manner.

The firſt Pond has been ſet apart for the breeding of Carp and Tench, which may breed as well as live together afterwards, for they will neither hurt one another when grown, nor devour each other's Spawn as moſt of the other Fiſh will.

Carp is the moſt profitable Fiſh the Farmer can breed, and 'tis therefore fit we begin with conſidering them, and deliver what relates to them moſt particularly. No Fiſh bears a better Price at Market of all that he can breed; and none ſpawns ſo frequently. When we add to this, that the Carp is of very quick Growth, we have compriſed all that can be ſaid in the Praiſe of a Fiſh to the Perſon who keeps it for his Advantage.

The Carp will breed at much ſhorter Intervals than any other Fiſh, and the young are vaſtly numerous: they require little Care, and are ſufficiently hardy. The great Caution of the Farmer, in this Caſe, is to provide and keep up a ſufficient Number of Breeders.

The female Carp never begins to breed till about eight Years old. The Male need not be more than five Years. The Purchaſer muſt examine their Size and Condition, before he puts them into his breeding Pond, that he may not be diſappointed. Many have condemned the Nature of their Pond, when the Fault has been in the Condition of the Fiſh from which they expected their Increaſe.

The Proportion of the Males and Females ſhould be about one of the former to three of the latter; and not only a proper Number muſt be put in at firſt, but a watchful Eye muſt be kept that they do not decreaſe without Supplies, for the Carp often dies after ſpawning.

The Tench agrees in all theſe Reſpects with the Carp; and being put into the Pond with the ſame Regulations, the two Kinds will breed perfectly well together.

Into the ſecond Pond are to be put the Pearch for the ſame Purpoſe, and with the ſame Cautions. They will breed when they are kept in

the other Ponds, but they are ſo ravenous that they eat their own Offspring. And the only good Way of feeding them is when they are put into thoſe Ponds nearly of the ſame Size.

As to the Pike they will ſometimes breed in the Ponds where they are kept for feeding, but they more affect to do it in large Rivers. The Pearch will alſo breed in their Ponds, but in this Caſe few of the young come to any thing, for both Kinds feed upon their own. The Rule of putting in Fiſh nearly of a Size into the feeding Ponds, is as neceſſary to be obſerved with Reſpect of the Pike as the Pearch, for they will both devour ſuch of their own Species as are ſmaller. A Pearch of half a Pound weight will ſeize one of a quarter of a Pound; and the Pike will lay hold of ſuch as are very nearly as large as himſelf: he will prey upon any thing that he can get into his Mouth, no Matter whether he can ſwallow it. A Pike has been ſeen with a large one in his Jaws, ſwimming about till that Part which he had gorg'd was digeſted, that he might ſwallow the Remainder.

Theſe are ſufficient Reaſons why the Fiſh of Prey that are put into Ponds to feed, ſhould be as nearly as poſſible of a Size: and there is ſome Cauſe, though leſs, for the obſerving the ſame Rule with the others, for though they will not eat the ſmaller, they will ſtarve them by not permitting them to get any Food.

There is no Way of matching the Size of the Fiſh ſo well, as by ſupplying the feeding Ponds from the breeding ones. For in theſe latter thoſe Fiſh that are of the ſame Breed, muſt be equal in Bigneſs, and being put into the ſame Place, and having the ſame Food, they will keep up that Equality pretty nearly. As to the Pike, they are generally purchaſed, and the Care ſhould be to buy them, as nearly as poſſible, of a Size, for otherwiſe the Number will decreaſe continually. When Pearch are bought, the ſame Caution is to be obſerved for the ſame Reaſons. As to Eels, they need not be ſo carefully pick'd, for they are defended from the other Devourers, by their Place of Habitation, the Mud; and though they ſeize upon any other Fiſh that they can get at, they do not prey upon one another.

The Farmer muſt be cautious not to ſuffer his Geeſe or Ducks, with their young Brood, to come upon his Pike Ponds, for that voracious Fiſh will ſeize the young, while they are in the Down, as readily as he would a Roach or a Gudgeon.

When the Ponds are ſtock'd, the Owner ſhould take Care that the Herons do not get a way of coming there, and be particularly guarded againſt Otters, if there be any in the Neighbourhood. Theſe are the Enemies of his feeding Ponds; and there is one little regarded, but very deſtructive in thoſe that are for breeding, this is the Stittleback. As contemptible an Enemy as this may ſeem, none is ſo deſtructive of the Spawn and the young Brood, and none ſo difficult to be conquer'd. I have known many Ponds that would have been excellent for breeding, ſpoil'd by this little Creature: and even the emptying them is hardly a Security; for theſe ſmall Fiſh will live in the leaſt Quantity of Water that remains in any accidental Hollow, and they breed ſo quick, and in ſuch Numbers, that they ſoon are in a Condition to renew their Miſchief. They lodge about and under the Stones where the Carp and other valuable Fiſh depoſit their Spawn. They devour this wherever they find it, as their natural Food: and what eſcapes and hatches into Life, becomes their Prey in that Condition, for they are eternally catching the young Fiſhes.

There has been ſuppoſed a great Myſtery in the Matter of breeding Ponds; and the beſt Judges have been obliged to refer themſelves to Experience; only ſaying ſome will and ſome will not do for that Purpoſe, and there is no knowing but from Tryal. We have already named the wrong Age of the Fiſh, put in by ſome as Breeders, for one Reaſon of the failing; another is this little deſtructive Fiſh; and a third may be the ill-faſhioning and conſtructing of the Pond. But let theſe three Articles be managed rightly, and the Undertaker will ſeldom fail. Let the Pond be made according to our Directions, with Shallows for the Spawn; let Fiſh of a proper Age and Condition be put in, and let there be no Stittlebacks; and there will never fail to be a Supply for the feeding Ponds.

The next Thing to be conſidered is the Numbers to be kept in the feeding Ponds, and this muſt be proportioned, in part, to their Extent, and in part to their Richneſs. A rich feeding Pond, of an Acre Extent, will every Year ſupport very well two hundred Carps, of three Years old. If they be put in younger the Number is to be encreaſed in proportion, the ſame Pond will as well feed three hundred Carp of two Years old, or four hundred of one Year old. If the Pond be leſs rich, the Number muſt be ſmaller, and if of the richeſt Kind of all, it may be ſomewhat encreaſed.

Tench feed in the ſame Way as Carp, and may be put in after the ſame Manner: it is a very good Method to put in one third Part of the Number of Tench; or more, according to the Nature of the Pond: theſe two Kinds agreeing and feeding perfectly well together.

As to the Nature of the Pond ſuiting one or the other Kind, it depends in a great Meaſure, on the Soil at the Bottom. The Carp loves a loamy Bottom, and the Tench a muddy one. The Carp, in the ſame Manner, loves a new Pond, and the Tench an old one. The Carp is always found to thrive beſt where there are a great many Weeds, and good Shelter, and where there grows good Graſs about the Edges of the Water: the Tench, on the other hand, loves a deep Pond, with a warm owzy Soil and hollow Banks; and delights in the Cluſters of Flaggs that often run into the Water to a good Diſtance from the Shore.

Theſe are the particular Conditions that ſuit a Pond to the one or the other of theſe Kinds of Fiſh; and from this the Owner will be led to conduct himſelf to the beſt Advantage, according to the particular Nature and Condition of his Ponds. If they be nearly alike, let him put Tench and Carp together into each, and proportion them according to the Nature of the Pond, adding to or diminiſhing the Number of the Tench, as the Pond appears, according to theſe Circumſtances, to be more or leſs ſuited to them.

them. If on the other hand one of the Ponds be very well ſuited to Carp, and the other to Tench, let him put all his Carp into one, and all his Tench into the other.

Although Tench and Carp be freſh Water Fiſh, they will thrive very well where it is a little brackiſh. This is a Conſideration of great Conſequence to thoſe Farmers who are ſituated toward the Sea, or Salt Rivers. They often have Grounds of no great Uſe where Fiſh Ponds may be very well dug and ſupplied, but that the Water will not be perfectly freſh: they need not for this Reaſon be diſheartened from breeding Carp and Tench; for they will ſucceed full as well there as in the moſt perfect freſh Ponds: the only Diſadvantage is, that where the Water is too ſalt, they do not taſte ſo well as in the freſh Water feeding; but where it is only a little brackiſh, they thrive rather the better; and the Difference is not perceived in the Flavour.

CHAP. XLV.

Of feeding, preſerving, and taking Fiſh out of Ponds.

THE Farmer has now, we will ſuppoſe, put in his Stock of ſeveral Kinds into his Ponds; and he requires to know what there is more that he is to do in this Article of his Profeſſion. They are to be provided with Food, preſerved from Injuries, and at proper Seaſons taken out for the Market.

As to the firſt Article, their feeding, we have told him already that requires little Care or Charge. The Pike and Pearch in his middle Ponds are to be furniſhed with a Quantity of Roach, Dace, Gudgeons, and the like, the common Draught of every little River; but he muſt have his Eye upon them, that if they do not breed, which they frequently will, eſpecially the Roach, he muſt at Times throw in a freſh Supply. As to his Carp and Tench Ponds, they in a great Meaſure ſupply the Fiſh themſelves by the Richneſs of their Water, and by the Inſects and ſmall Animals that breed in them: but if at Times he throw in Grains, Blood, and the Offal of Chickens, their Guts, and the like, the Fiſh will feed the faſter. The ſame may be thrown into the ſeveral breeding Ponds; the Grains into the Carp and Tench Ponds, and the Offal into the Pearch.

This is all that is required on the Article of feeding, ſo that 'tis certainly as eaſy and as cheap as it has been repreſented.

As to the preſerving the Fiſh from Injuries, we have already named the keeping away Herons and Otters; and a farther great Care muſt be to keep off Thieves, eſpecially near great Towns, where there is a ready Market for what they ſhall ſteal: the keeping a good Watch, and the ſinking Things in the Ponds in a proper Manner to prevent the drawing of them, are the great Security. But there is another Accident to be named here by which great Numbers of Fiſh are deſtroyed, that is the Froſt.

People have ſeen that when the Water is altogether covered with Ice, the Fiſh languiſh, and if this continue a long Time they die. For this Reaſon they break the Ice, and uſe ſuch other Means to let in Air as they can, and this always has a good Effect: but there is one Thing farther Experience confirms, which is, that the Damage done by Froſt is much greater in foul Ponds than in clean. For this Reaſon the Occaſion of the Froſts doing Miſchief ſhould be prevented in Time. Ponds ſhould be frequently cleaned, which, as has been ſaid already, is an Article of Advantage to the Farmer rather than Expence, becauſe of the Value of their Mud as a Manure. When they are thus kept tolerably clean, the Froſt will have leſs Effect upon the Fiſh; and to prevent the Damage entirely, there ſhould be a few Pipes laid into the Water in different Places, with their Ends above its Surface. Let the Froſt be ever ſo ſevere, theſe will always keep a Communication with the Air, and with this Caution, and the Cleanneſs of the Bottom, the Fiſh will be perfectly well preſerved from Accidents.

Some lay in Straw for this Purpoſe, but its Effect is not ſo certain: that of a few Pipes is obvious, and cannot fail. The frequent cleaning of Ponds beſide this, is in all Reſpects ſerviceable to the Fiſh; and as it alſo ſerves the Farmers Purpoſe in a Supply of Manure, and anſwers its own Expence, there is all the Reaſon in the World to do it.

Laſtly, for the taking the Fiſh out of the Ponds, there require a few Inſtructions: they are very ſhort and eaſy, but the Neceſſity of them ſeems not very well known, for ſome Damage often happens for want of a Regard to them, and on ſome Occaſions a great deal.

In the common Way of taking Fiſh out with Nets, a great deal of Miſchief is done by Servants, hurting thoſe which are to be thrown in again, by Blows; and by keeping them too long out of the Water: and in the other Way of draining the Ponds, a great Diſturbance is made by letting the Water of one into another. Againſt this we have already propoſed a Method, by a Ditch cut along the Side of the Ponds, which every one who deals largely in Fiſh, will find vaſtly worth his while to practiſe.

Once in three Years every Pond ſhould be drained, and the Fiſh taken out and ſorted, removing the larger and the ſmaller than ordinary, to keep up that Equality which we have ſhewn to be ſo eſſential an Article in the Management of every Kind.

The breeding Ponds are to be drained as well as the others; and from them are to be taken the young Fiſh of proper Size for the Supply of the breeding Ponds, in anſwer to the Quantity that have been taken out. And when this is done, the Remainder are not to be thrown into the breeding Pond again, for they will ſtarve the Breeders: but they muſt be put ſomewhere to take their Chance, if they be not wanted on any particular Occaſion.

On this Occaſion great Care muſt be taken not to hurt the Breeders, either by Violence, or by keeping them too long out of the Water; and if the due Numbers be found deficient, they muſt be ſupplied with thoſe of a proper Age and Condition.

In this Manner the whole String of Ponds will be kept in good Order, and yield the greateſt poſſible Advantage: there will be a conſtant Supply from the one to the other; and theſe Creatures will anſwer as regularly to the Farmer's Expectations, as any other Part of his Stock.

Whenever any Fiſh are taken out for Sale, the Maſter's Eye ſhould be over the Draught for two Reaſons; it will keep in his Mind a due Knowledge of the Condition of his Stock, and he will ſee that no Hurt is done to ſuch as are to be put in again.

We ſhall now add a few Obſervations in a general Way, and then cloſe this Article.

If it happen that the Farmer have Convenience of digging a Pond where it ſhall have a marley Bottom, he may be ſure of feeding Carps there to a very great Advantage. If he have Opportunity alſo of making a Pond in ſome Place where it ſhall receive the Waſhings of Sinks, or the Foulneſs from great Houſes, or about large Towns, he may be ſure in the ſame Manner, that both Carp and Tench will grow and fatten there in a ſurprizing Manner. If he have the Opportunity of making a Pond at the Head of a chalky Spring, he may feed Trout in it, and this is the only Condition of a Pond that can ſuit it to that Fiſh: but even here they will not ſucceed as in Rivers. If the Pond be dug in a Bed of Clay, or if he be obliged to clay it in order to make it hold Water, and it be found too cold for the more valuable Kinds of Fiſh, he may breed Flounders in it. They will take Care of themſelves, and will grow to a great Size in it. They ſeem to thrive in ſuch Ponds better than in Rivers, but their Taſte is not ſo fine.

When Ponds are to be made in boggy and ſpringy Places, where Carts cannot well come to get away the Mud thrown up in cleaning them, the beſt and moſt advantageous Method is to dig them long and narrow, like Ditches rather than Ponds, that the Workmen may be able to throw out the Mud on either Side at a ſingle Throw.

The Pike grows ſo faſt, that it is very well worth the keeping in feeding Ponds, becauſe of the quick Increaſe in Value. Pike of ſix Inches long may be had for a very ſmall Price near large Rivers, and if put into Ponds with Plenty of Food, they will grow to fourteen Inches length the firſt Year, and the next to two or three and twenty Inches. If the Owner have a mind to fatten them, nothing anſwers the Purpoſe ſo well as Eels chop'd to Pieces: they will devour theſe greedily, and fatten upon them like Pigs. When the Pike grows to a good Size, and is in due Condition, he bears a good Price, but the conſtant and marketable Fiſh is the Carp. It is on this the Perſon who intends to make Advantage of his Fiſh Ponds, ſhould principally rely for it; for none requires ſo little Trouble, or is liable to ſo few Accidents.

Among the ſeveral Kinds of Fiſh that he can keep, there is none ſo ſafe from the common Accidents as the Carp. It will endure Hardſhip of Froſt and other Kinds, better than any; it is ſhy in a great Degree, ſo that it preſerves itſelf from common Enemies, and no Fiſh is more difficult to be taken out by the common Methods of ſtealing. They will not readily bite the Hook when grown to a Size, eſpecially in Ponds of the rich Kind, that have been recommended for the feeding them; and even the caſting Net rarely ſurprizes them. They have a Way of plunging to the Bottom upon the firſt Notice of any Diſturbance in the Water, and their Way is to ſtrike their Heads into the Mud. In this Caſe the Net draws over their Tails, without laying hold of them. No Fiſh is therefore ſo ſecure to the Owner, nor any of ſuch certain Sale in all Places.

BOOK V. PART IV.

Of INSECTS.

CHAP. XLVI.

Of Bees, their Nature and Products.

AMONG the Inſect Kind there is but one Species with which the Huſbandman at this Time has any Concern. That is, the Bee. A Creature which has this great Recommendation to his Notice, that is, to be kept with very little Expence, and leſs Trouble; and which at the ſame Time yields him two Commodities that are always marketable, and always bear a conſiderable Price, Wax and Honey.

Volumes have been written on the Bee before its Nature was ſo well underſtood as it is at preſent: Volumes therefore might be added, for with the more perfect Knowledge of its Nature, we have arrived at the Diſcovery of many other of its Properties: but we do not in this Work intend any where to expatiate for the Sake of an idle Curioſity. That it is the Intereſt of the induſtrious Huſbandman to keep Bees is plain, becauſe they will bring him Profit, and naturally fall in the Way of his Profeſſion; this therefore we recommend to him: and that he may be able to do it in the moſt advantageous Manner, we ſhall, as on all other Occaſions, lay down the beſt Rules Experience has ſhewn for that Purpoſe. And as we have endeavoured to explain to him every Article of his Buſineſs, that he might always not only know what he ought to do, but why he was to do it; we ſhall in the ſame Manner lay before him in a few plain Words, on Account of this Creature, ſo far as he needs to know it, with the Nature of thoſe Products which it offers to his Service.

The Antients ſuppoſed Bees to be produced from the corrupted Fleſh of Animals, and they pretended to lay down Methods of procuring them

them by this Means: but all this is known to be an Error. Virgil adviſes the killing of a Bull Calf, and expoſing its Fleſh in a particular Manner for the breeding of Bees in it; but there is no more Truth in this than in Sir Kenelm Digby's Receipt to make Crawfiſh, by burning and beating to Pieces others.

We know at this Time that all Creatures, the leaſt as well as the greateſt, are produced from the Eggs or Embryo's of their Parents, and that they can be produced in no other Manner.

In the Generation of Inſects, Nature obſerves this conſtant Method, that all ſuch as have no Wings, are produced from the Eggs of their Parents, or brought forth alive in their own Forms, whereas all thoſe which have Wings undergo a kind of Change. Theſe are hatch'd from the Eggs of their winged Parents, in form of Caterpillars, Worms, or Maggots; in which they live a certain Time, and then fall into a State of Reſt, covering themſelves with a Web or Caſe of their own making; or ſhrinking into their Skins which harden for that Purpoſe: and after they have lain a certain Time thus, they break forth in the winged Form like their Parents.

This has been ſuppoſed to be much more wonderful than it is; the vulgar have thought that it was a Change of one Creature into another; and the learned have adopted the Folly, as it were, under the hard Word Metamorphoſis of Inſects. But the Truth is, the Butterfly is in the Caterpillar, and only takes that Time to grow to its due Perfection.

As this is the Caſe with all winged Inſects, the Bee being one of them, muſt have its Origin in the ſame Manner, and the Method is this. When the Combs are made, a Female Parent lays an Egg in every Cell, theſe Eggs hatch into a Kind of white Maggots, and after theſe have lived their Time, they fall into a State of Reſt within the Cell, and in due Seaſon the Bee burſts forth, and takes its Flight.

There is this very ſingular in Bees, that they are of three Kinds. In the Generality of Animals there is a Male and Female Sex, and no other Difference; but among Bees, there are Males, Females, and others of no Sex at all.

Theſe laſt are the great Number, and go through all the Drudgery. The Males are but a moderate Proportion, and when they have performed their Office in impregnating the Females, they are driven out of the Hives to periſh. The Females are very few, but each lays a vaſt Number of Eggs, and they are always taken great Care of in the Swarm. They are diſtinguiſhed from the others by their Size and Shape, and have been called by the Names of Kings and Queens of the Swarm.

The two valuable Subſtances with which the Bees ſupply the Farmer, Wax and Honey, are both extracted from the Flowers of Plants. The Wax is ſomewhat altered by the Creature to bring it to that State, but the Honey they find in its own Form.

In the Flowers of Plants there ſtand up certain ſlender Threads, with little Lumps upon their Tops. Theſe are in ſome more, in others fewer, and upon the Number of them is founded the preſent faſhionable Method of claſſing Plants. Theſe Lumps or Knobs which ſtand thus in the Centre of the Flowers, contain a fine Duſt, which ſerves to impregnate the Seeds of the Plant: but as Nature frequently provides for many Purpoſes in the ſame Thing, this Powder or Duſt which is formed in a much greater Quantity than it is wanted for the Service of the Herb, aſſiſts the Bee for its Combs, in which to depoſit its Honey and its young, furniſhing the Materials of which Wax is fabricated by the Creature.

Toward the Bottoms of ſome Flowers, and at the Bottoms of others, there are alſo certain Cells, or Lodgments of different Kinds, Shapes and Forms, in the which is held a ſweet Juice: this is Honey. This the Bee takes out, and has nothing more to do than to remove or carry it to its Cells.

This is the real and certain Origin of Wax and Honey. The Bee feeds upon the Duſt which is found in theſe Lumps in the Centre of Flowers, and afterwards diſgorges it for the Service of the Hive. It affords ſome Nouriſhment to the little Body of the Inſect, and after that is carried off, and the Reſidue has undergone the Operation of the Creature's Stomach, it is Wax. With this the Combs are formed of that beautiful and uſeful Figure, and in the Cells of theſe is depoſited the ſweet Juice, which they collect from the Bottoms of Flowers, and which, without any Aſſiſtance from them, is Honey.

This is the Hiſtory of that ſurprizing Inſect the Bee, and thus much it is fit the Farmer ſhould be acquainted with, for the reſt it is matter of Curioſity, rather than of Uſe; and a great deal might be ſaid very prettily, but very uſeleſly with Reſpect to him on the ſeveral Subjects. After this ſuccinct Account of the Creature, and the Origin of its Products, we ſhall enter upon the uſeful Part; the beſt and moſt advantageous Methods of managing them.

CHAP. XLVII.

Of Hives, and the Manner of placing them.

THE Bee in the natural Courſe and Conduct of its own Life, joins its Fellows, which collect together into a Swarm, and make of the Wax they thus collect and prepare from the Duſt of Flowers, certain Cells, which being joined one to another, form the Combs; and in theſe Cells they depoſit the Honey they take from the Bottoms of the ſame or other Flowers.

In their State of Nature they place theſe Combs in the Hollow of a Tree, or ſome ſuch Cavity, into which the ſmaller Entrance the better for their Safety: in order to make the moſt commodious Advantage of their Products, Men have contrived Places of Reception for their Combs, into which they tempt the Bees to come. Theſe are Hives, which in different Places, and at various Times, have been contrived to be made of ſeveral Forms and Materials; but the uſual Kind at preſent are made of twiſted Straw, and none anſwer better. A great many

many Sorts have been deviſed for Pleaſure, and the Curioſity of ſeeing them work; but for the plain Uſe and Advantage to be had from the Creature, none anſwers better than this common Kind, nor is any other worth the Huſbandman's Regard.

There have been many Contrivances of late to ſave the Bees when the Honey is taken; but theſe are not neceſſary; for a proper Management with the common Hives, placing one over another for the Reception of the Creature, will anſwer all the ſame Purpoſes. We do not ſay that this will anſwer all the Purpoſes that are pretended to be anſwered by the others: but all that they really effect.

The Form and Faſhion of the common Straw Hives is ſufficiently known; but they are often made too high for their Width. The beſt Size is ſuch as would hold about ſix Gallons, and the Huſbandman will do well to order theſe to be made a little more ſquat than the common Practice allows.

Beſide theſe there ſhould be ſome of a ſmaller Size for the multiplying the Stock of Bees, and receiving the little Swarms; and it will be right to have a few larger, that they may be in Readineſs for an extraordinary large Swarm.

The Hives muſt be trimmed as ſmooth and even as may be, cutting off all ſtaring Straws, and the Spleets are to be then put in, three or four deſcending from the Top to near the Edge, and a Couple of others to ſupport the Opening or Door, and two more behind: theſe laſt are to be thruſt firmly into the Subſtance of the Hive, to keep it from ſinking when it is full.

The Hives being thus prepared for the Reception of the Bees, the next Conſideration is that of finding a fit Place for ſetting them: for the Bee is tender in its Nature, and the whole Work will proceed greatly the better, for a little Care in the ſetting out.

Let a Spot be choſen not far from the Houſe, and well defended from Winds every Way. The beſt Security of this Kind is by proper Hedges; and theſe ſhould be ſo contrived as not to keep out the Sun; for the Bee requires Warmth, as well as Stillneſs. The Place muſt be well defended againſt Cattle, both for the Bees Sake and their own; for theſe little Creatures hate Diſturbance, and they generally reſent it very ſeverely. The beſt Situation is when the Houſe, or ſome large Building, ſtands to the North, that it may be perfectly defended on that Quarter, and the Opening is to the South, to let in the beſt Rays of the Sun. There ſhould be alſo ſome Trees pretty near to receive them at the Times of their ſwarming.

The Place being thus choſen, let there be ſet up a Parcel of Stools for the Hives to ſtand upon. The uſual Method is to ſet ſeveral together on a Bench, but it is not ſo well. It occaſions a great deal of Confuſion among the Bees, who often miſtake one Hive for another, and in Winter they will quarrel about it, and do one another a great deal of Miſchief.

The Stools ſhould be made of Wood, for when cover'd with Stone they are too hot in Summer, and too cold in Winter. They ſhould be raiſed about a Foot, or a little more from the Ground, and placed not exactly upright, but a little ſlanting, that the Water which falls on them may run off. On the Top they ſhould be about an Inch broader than the Bottom of the Hive; and in Front juſt before the Door of the Hive, they ſhould have an Extent of the Bigneſs of one's Hand for the Bees to ſettle upon when they come home loaded. Theſe Stools ſhould be ſet in a Row from Weſt to Eaſt, and they ſhould point South, a little inclining to the Weſt, that the Body of the Hive may break the Eaſt Wind from the Door.

For yet farther Security, theſe Stools, with the Hives upon them, may be incloſed in a little boarded Building, either ſingly, or ſeveral of them together; which may have a tiled Covering to keep off wet, and Doors to ſhut or open according to the Severity or Mildneſs of the Seaſon.

This is not a Thing of abſolute Neceſſity, for People keep Bees to a great Advantage without ſuch Trouble; but it is right, and what I would adviſe the Huſbandman to do; for the Expence is little; and in this, as in every other Article of his Stock, thoſe Things which will of themſelves ſucceed very well, will bring him in larger Profits in Proportion to the Care he beſtows upon them. In general, whatever Methods are uſed to guard againſt the Things that injure Bees, the two greateſt of theſe are cold and wet; and of thoſe two the latter is the greater.

The Winter is the Seaſon in which Bees are moſt liable to Injuries; but theſe they in a great Meaſure eſcape if their Hives be well made, and well defended, and they will keep within them. Any Thing of a Building about the Hives ſerves to darken as well as to ſhelter them; and this in Winter is of great Service, for it prevents their going out at every Time when the Sun happens to ſhine a little, which they otherwiſe are too apt to do, and ſo are killed by the Cold while they are abroad.

It is for this Reaſon the greateſt Number of Bees periſh in the mildeſt Winters. This ſounds odd, but they keep within the Hives in very ſevere Seaſons, and are there ſafe, whereas they go out in theſe mild Days and periſh.

When Bees are thus kept duſky and ſheltered during Winter, the Doors are to be thrown open early in Spring, to promote their Induſtry and their Breeding.

At the Time of the Bees ſwarming, the Hives intended to be uſed are to be rub'd with Thyme, Hyſſop, or Bean Tops, which will pleaſe the Bees, and it is a good Method to rub a little Honey on the Inſide.

The Hives are to be plaiſtered down to the Stools with a Mixture of Cow Dung, Sand, and a little Lime, this muſt be carried round the Edges to keep all cloſe, and fence out the Wind; and in the Winter the Door of the Hive ſhould be ſtopped with a ſmall Piece of Board that has two or three Notches in it to let the Bees through, and not large enough to let in any Thing that would hurt them.

CHAP. XLVIII.

Of the ſwarming of Bees.

WHEN the Bees encreaſe, ſo that they are too many for the Hive, they naturally ſwarm. The Time of their doing this is the Beginning of Summer, and this is a Seaſon at which the Owner is to watch them with a particular Care, for the Encreaſe of his Stock and his Profit depend principally upon his Management at this Juncture.

It is plain that the Fullneſs of the Hive is the Reaſon of their ſwarming, becauſe they ſometimes get a Way of lying out of the Hive, under the Stool or behind; and in this Caſe, not perceiving the Hive to be full, they will not ſwarm, although their Number is greater than in other Hives where they ſwarm, becauſe they keep within.

The ſwarming of Bees depends upon many Accidents, and none more affects this Article in their Œconomy, than the Weather. In a mild and calm Spring they ſwarm early: in a cold and backward Seaſon they do not ſwarm well; and what they do in it is later.

Toward the Middle of May, if the Seaſon favour, the Owner is to watch the Hives to be prepar'd for their ſwarming. When the Drones are thrown out early, it is a Sign the Hive is full; and when, after this, the Bees are ſeen continually in Cluſters about the Door, and often lie out; and when there is ſome Moiſture about the Foot of the Hive, at times, and they hover in great Numbers together round the Door, it is always a Sign of ſwarming. When there happens a warm Gleam of Sun, after a ſlight Shower in the Middle of a calm Day, they may be expected to take that Opportunity of riſing; and if, juſt after this, they be ſeen hanging in Cluſters, about the Door of the Hive, it is to be immediately expected.

If the Weather prove ſtormy when the Bees are ready to ſwarm, it will prevent them; and if this happen from time to time, they will be put off entirely, and the Opportunity loſt for that Seaſon. Sometimes alſo, in extreamly hot and dry Weather, they will be ſo continually out, and ſo many of them together, that not perceiving the Fulneſs of the Hive, that alſo will prevent them from ſwarming.

As their own Senſe of the Fulneſs of the Hive is a great Reaſon of their ſwarming, the Owner ſhould take all Opportunities to force them in, in good ſwarming Weather, when they lie out at the Door. He ſhould alſo ſhade and cool the Hive at theſe Times, if the Weather be very hot. At the ſame Time, if thoſe which hang about the Stool be gently mov'd off with a Bruſh, it will cauſe them to riſe, and the Noiſe of ſeveral of them flying up together, will ſometimes call up the others, and make them ſwarm.

When the Bees lie out in great Numbers it is a good Method to raiſe up the Hive, and let them all in, and then faſten down the Sides with Cow Dung and Sand beat up together, leaving only the Door open. This will make them perceive the Fullneſs, and they will often be led to ſwarm almoſt immediately.

The good Women have many idle and ſuperſtitious Cuſtoms for making Bees ſwarm: but theſe are founded upon Reaſon, and the Nature of the Inſect; and if theſe do not bring them to it, they will rarely be made to do it any other Way.

One Swarm not ſufficiently unloading the Hive, at eight or ten Days Diſtance, there is another ready. Theſe are what they call After-Swarms, and they always know of their coming out by the Noiſe. They ſeem to call one another forth with a ſharp and ſhrill Note, and preſently riſe in Numbers.

When the firſt Swarm happens to be broken, the ſecond will ſometimes come the next Day, and after this there will come a third, and ſometimes a fourth: but all this uſually happens within fourteen or fifteen Days.

There is no Subject on which the Country People have been more ſuperſtitious than this of Bees, but we wiſh to break through thoſe idle Cuſtoms. One of theſe is, that as ſoon as the Swarm is riſen, they ring upon a Kettle or Pan, and make as loud a Noiſe as they are able; they imagine this aſſiſts the ſwarming, and brings them down, but nothing is more contrary to Reaſon. Their ſwarming is an Operation in the Courſe of their Nature, and all that is to be done is to let them be quiet while they are about it: all Noiſe diſturbs them, and they ſhould never be interrupted. If there be any Danger of their wandering, a little Duſt is to be thrown among them, and it never fails to quiet them, and bring them down.

The beating upon Kettles and Mortars was probably invented only as a Signal to the Neighbours, that ſuch a one's Swarm was up; they who invented it did not know that it was of ill Conſequence, and they have been followed in it by thoſe who have imagined it to be uſeful.

Sometimes one Swarm of Bees will caſt another in the ſame Year; this is an Article of which the Huſbandman cannot be ſo well aware, as of the firſt and more certain ſwarming; but he is to watch as ſoon as he ſees the firſt Signs of it, and follow them in all Reſpects as the firſt Swarms, getting them into an Hive according to the Directions to be given in the ſucceeding Chapter.

When it happens that the Swarm parts, he is to conduct himſelf according to the Diſtance at which the two Bodies ſettle.

If they be within Sight of one another, the beſt Way is to diſturb the leſſer Cluſter, and they will riſe and go to the greater: if they be out of Sight they muſt be hived ſeparately.

CHAP. XLIX.

Of the hiving of Bees.

WE have, in the preceding Chapter, directed the Huſbandman in what Manner to prepare his Hives for the Reception of the Bees: theſe being ready, he is to get them into them

in

in the following Manner. He is to watch the Swarm till they have fix'd upon the Place where they ſhall light: they ſoon begin to cluſter together there, and when they are clung one to another, and well ſettled, and the whole Company are met, they are in a Condition to be got into the Hive.

According to the Bigneſs of the Swarm he is to chuſe a larger or ſmaller Hive, and his great Care is to get them properly into it. The Bee is a Creature that will bear ſome Diſturbance without Reſentment, but they muſt not be too far ruffled; when they are angry their Sting is a very ſevere Weapon. It may always happen that ſome of them may be provoked in this great Article of hiving, and for that Reaſon the Perſon who undertakes it ſhould be prepar'd againſt the Danger. Let him have a Net wove, with the Meſhes ſo ſmall that the Bee cannot get through them, and large enough to be put on over his Hat, and fall down upon his Shoulders. His Face and Neck will be thus perfectly defended, and he will be able all the while to ſee what he is doing: let him put on a thick Pair of Woollen Stockings, and a Pair of Gloves of the ſame Stuff, which it will be beſt to draw up pretty high upon his Arm. When he is thus defended, let him go to work ſedately and ſoftly, for any haſty Motion diſturbs and angers the Bees.

Let a Cloth be ſpread upon the Ground near where the Bees are ſettled, and the Hive laid upon it. Their common Place of alighting is the Bough of a Tree, and if this be a ſmall one let the Huſbandman approach ſoftly to it, and gently cut it off; let him take it down quietly and lay it upon the Cloth, and ſet the Hive over it. This is the moſt familiar and eaſy Way, and none ſucceeds ſo well: when the Bees have ſettled upon a larger Bough, or otherwiſe diſpoſed themſelves, ſo that this Method cannot be taken, the Huſbandman is to ſhake them off into the Hive, and then to ſet it upon the Cloth ſpread for that Purpoſe. If they happen to light near the Ground, the beſt Way is to draw the Cloth under them, and then ſhaking them off, cover them with the Hive. When any Number gather at ſome little Diſtance from the Hive, he is to move them gently toward it with a Bruſh; and if they take to any other Place, he is to wipe them off with the Bruſh, and rub the Place with ſomething diſagreeable to them, as Wormwood, or ſtinking Mayweed. Finally, the Swarm is to be ſet as near as can be to the lighting Place, and all left to be quiet.

Sometimes the Swarms come late, and are ſmall, the beſt of them not ſufficient to fill the leaſt Hive, in this Caſe the Huſbandman is to put two or three of them together in one Hive; for otherwiſe they will be poor, and liable to Accidents, and will rarely come to any thing. If two or three of theſe follow one another, though not on the ſame Day, ſtill let him take them one after another into the ſame Hive, and by thus joining them, and forming a tolerable Body, they will become induſtrious and be able to defend themſelves, which ſingly they would not do.

The Method of joining theſe ſeveral little Swarms is this. Near the Stool where the united Swarm is to ſtand, ſpread a Cloth upon the Ground in a calm ſtill Evening, when it grows dark; then ſet two Supporters for the Hive, and knock down the Hive out of which the Bees are intended to be removed; then lift it up, and clapping it between the Hands, to get out the Bees that ſtick to its Sides, lay it down on one Side by the Bees; and over them ſet the Swarm to which they are to be added, placing their Hive upon the Supporters. They will naturally riſe into this Hive, where they will join the Bees that are in it; and if any remain about the empty Hive, it is only diſturbing them, and they will follow the reſt, and the two Swarms will become perfectly one. In this Manner alſo another Swarm may be added to them, and one Hive may be thus well fill'd with thoſe Swarms, that would have ſucceeded very badly in two or three. When the Bees are all got in, let the empty Hive be taken away, and the full one plac'd upon a Stool that Night, or the next Morning early.

There is another eaſy Method of uniting two Swarms, or more, which is this. Let the Hive into which a ſmall Swarm has been taken, be turn'd Bottom upwards, and in that Manner fix'd to the Bottom of the other Hive with its Swarm, faſtening up the joining of the two. The Bees in that which is undermoſt will fly up into the other, and then the lower one may be taken away. In this Manner a ſecond or third ſmall Swarm may be added to the firſt, till it be encreaſed to a proper Quantity. But this muſt be done before the Bees have begun to make Combs in the Hive they are removed from; for when they have once ſet to work they are unwilling to quit it. For this Reaſon whatever Method be taken of joining of Swarms, the ſooner it is done always the better.

Leſs Time is to be ſuffer'd to paſs on theſe Occaſions, than thoſe unacquainted with the Nature of Bees might imagine, for as ſoon as they are ſettled in the Hive they get to work, and in a very few Days they make a ſurprizing Progreſs, forming in that Time large and compleat Combs.

When an old Stock of Bees is to be removed from one Place to another, a proper Seaſon, and a proper Day are to be choſen for that Purpoſe, and it is to be done with a great deal of Caution. The Beginning of October is the beſt Time, but it may be done in February, or any Time in the Winter; but fair and ſtill Weather ſhould be choſen for the doing it; and an Evening is the beſt Time, when the Bees are quiet.

CHAP. L.

Of the preſerving of Bees.

THE Bees, for the greateſt Part of the Year, provide perfectly well for themſelves; but in hard Seaſons they are to be aſſiſted, they will repay the Owner's Trouble with Intereſt, and the Food he is to give them is not expenſive, when the Smallneſs of the needful Quantity is conſidered.

One Article that makes this the leſs expenſive is,

is, that the Number of Bees at the Time when this is wanted, is not nearly equal to what it is at other Seaſons of the Year. 'Tis only in Winter they require Aſſiſtance, and their Number is by that Time greatly decreaſed by their Deaths, ſince the Time of their ſwarming. A great many die toward Autumn, and many more as the Weather grows more ſevere, ſo that by that Time they want Food, the Number is much reduced that is to eat it.

Beſide, the feeding them in Winter when their own Store fails; it is often very proper to do it in Spring, when the Stock of Honey is ſmall, and the Quantity of Bees large, as will ſometimes happen at this Seaſon from unfavourable Weather. Nothing is then better worth while than to feed them; and the beſt Way of doing this, is by conveying the Food in a Cane, or little Trough, into the Hive. Many Kinds of Food have been contrived for them, but the beſt I have found on repeated Experience, is a Mixture of Honey with ſweet Wort, or new Beer, and a little Bay Salt: this not only gives them the needful Supply of Nouriſhment, but always makes them healthy and vigorous. Some give Bread ſopped in Ale, and they will eat it greedily: the Honey is, however, certainly the beſt, becauſe it is the moſt natural Food: the Mixture of Salt I firſt tried, from obſerving that Bees ſucceed better in the Neighbourhood of the Sea, or Salt Rivers, than in any other Places; and ſince the Succeſs of this Food, I have always made it a Cuſtom to ſet a Pan of Water, with a little Salt in it, near the Hive.

The Seaſon of Spring feeding is in March. This is the Time when they begin to breed, and if they have had a bad Seaſon and want Food, they cannot attend as they ought to do, to the great Affair of producing their Young, which is of all Conſiderations relating to them, the moſt important to him who wants to increaſe his Stock.

The Bees that want Food in the Winter very often do not deſerve it; but theſe always repay the Obligation largely.

We have ſhewn the Huſbandman what Methods he is to uſe for the keeping his Bees alive at all Times, and making the moſt of their ſeveral leſſer Swarms; but we are yet to remind him of guarding them againſt ſuch Things as are naturally offenſive to them; and preſerving them from many Things that would deſtroy them.

Quiet is a great Article in the Care of Bees, therefore all Noiſe and Diſturbance are to be as much as poſſible kept from them. We have already directed that Cattle ſhould be kept away by good Fences, and for this Reaſon the Place of their ſetting them ſhould be far from publick Roads, or Cartways.

Smoak is very deſtructive of them, and they are always to be carefully defended from it, eſpecially that Smoak which riſes from the burning any Thing upon the Ground, for it is eaſily driven by the leaſt Wind juſt upon them, being on their Level, and it choaks and deſtroys them. All bad Smells alſo do them Harm, and render their Habitation diſagreeable.

After theſe Conſiderations, he who keeps Bees is next to take Care that they be not expoſed to the Inſults and Deſtruction of their ſeveral Enemies, Field Mice will deſtroy them, and Birds of many Kinds will devour them: Care muſt be taken to deſtroy and keep theſe away.

In Years wherein Waſps and Hornets are numerous, they do great Miſchief, entering the Hives, and plundering them of the Honey; but it is eaſy to guard againſt theſe, by ſetting Viols of ſweeten'd Cyder near the Hive, nothing tempting the Hornet and the Waſp ſo much.

Beſide theſe foreign Enemies, the Bees are often very troubleſome, and deſtructive to one another, by fighting. One Way to ſtop this Miſchief is by cloſing up the Hive: but if Matters be too far gone to admit this Remedy, the ſprinkling a little Duſt among them anſwers the Purpoſe.

CHAP. LI.

Of taking the Honey and Wax.

THE Huſbandman keeps Bees for the Sake of their Honey and their Wax. He has ſeen the neceſſary Methods of feeding and preſerving them; we now come to the Article which is his immediate Concern, the making his Advantage of their Products.

Of the Wax they make their Combs, and in the Cells of thoſe Combs they depoſit their Honey. The Wax not being eaten would remain uninjured in the Hive during the Winter; but this is not the Caſe with the Honey. It is the Store they lay up in Summer for the Proviſion of that Seaſon; and the Way for obtaining it in the largeſt Quantity, is to find the exact Time when the Combs are fulleſt.

All the Summer they are collecting Honey: in August the Combs are fulleſt, and from that Time the Bees often eat more than they get, ſo that the Quantity decreaſes. This points out the End of August very plainly, as the Time at which there is moſt Honey in the Hive: that therefore is the proper Seaſon for taking it.

The old Way is to kill the Bees, and take their Produce at this Seaſon: but many Methods have been invented for ſaving them. However, as there is not any great Purpoſe anſwered by preſerving them when their Food is taken away, unleſs more Care and Trouble be taken about them, than it is worth the Farmer's while to beſtow; I ſhall adviſe him to follow the old Method, and deſtroy the Swarm when he has taken their Stores. This Practice is not ſo cruel as it appears, for the Life of the Bee is very ſhort naturally; and with the beſt Management they paſs but an uncomfortable Winter after they are robbed of their natural Proviſion.

At the End of August therefore let the Huſbandman conſider what he will keep, and what he will kill. In this he is to be directed in a great Meaſure by the Age of the Swarm, the beſt to keep being thoſe of one or two Years ſtanding; or thoſe of three or four Years, which, by Reaſon of their ſwarming the laſt Summer are full of Bees, and are the moſt likely to be good. The Swarms of three or four

Years old which have caſt Hives are to be killed, becauſe they are not like to continue; as are alſo thoſe poor Swarms that are not worth the feeding; and all light Stocks, and ſuch as do not carry out their Droſs, or drive away the Drones in good Time. Theſe are the principal Rules for the Farmer's Conduct in this Matter, and to theſe may be added, that he ſhould take for killing all ſuch as are three Years old or upwards, that have miſſed ſwarming the two preceeding Years, and ſuch as are weak and eaſily plundered. Theſe are the Directions he is to follow in the taking them, and he is not to omit the Temptation of a large Store, whatever be the Condition of the Hive: therefore if he perceive any to be very full, as they will ſometimes in good Years be down to the Bottom, he muſt take theſe, for they never can be better, and often one ſuch Hive is worth three.

When the Hives that are to be taken for the Honey are marked, let there be a Hole dug in the Ground of about nine Inches deep, and nearly of the Bigneſs of the Bottom of the Hive, with the fine Mould piled up round the Brim. Having this Hole prepared, about two Hours before Sun ſet, take a Brimſtone Match as long and thick as a large Skewer, fix it in the Slit of a ſmall cleft Stick, with a ſharp Point. Stick this in the Ground at the Bottom of the Hole, ſo that the Top of the Match may come within an Inch of the Level of the Rim: if one be not thought ſufficient, another may be added, prepared in the ſame Manner. Let the Top of each Match be lighted, and then ſet the Hive over the Hole. Draw the fine Mould about the Edges to keep in the Smoak, and thus let it ſtand a Quarter of an Hour. In that Time the Bees will be all dead.

The Hive is now to be taken into the Houſe, and the Combs are to be carefully ſeparated, taking them out one by one. The dead Bees are to be bruſhed off with a Feather, and when that is done, the Combs are to be broke each into three Pieces.

There will a good deal of Honey flow naturally out of theſe, and this is to be kept by itſelf. It is called Virgin Honey: but the ſame Name is alſo given to the firſt Honey of any Swarm. Let this Honey be put in a Pot, and ſet by two or three Days; in this Time if there be any Mixture of Wax or other Foulneſs among it, that will work to the Top in a kind of Skum, and is to be taken off.

After the Combs will run no longer, they are to be preſſed, and this Way they afford a large Quantity of what is called common Honey. The Combs after they have been thus preſſed, are to be waſhed, and when all the Sweetneſs is out of them, they are to be worked for Wax. The Liquor in which they are waſhed, and the coarſer Part of the Honey, are uſually made into a kind of Mead.

The waſhed Combs are to be ſet over the Fire in a large Kettle of Water, and boiled, ſtirring it continually about to prevent burning to the Bottom or Sides of the Kettle. When the Wax is well melted, pour all into a Strainer, and immediately put it into a Preſs, ſetting a Veſſel of cold Water under it; into this let the Wax fall; and let the Preſſing be continued a long as any Wax can be forced out.

When all is thus got that will come, let it be taken out of the Water, and moulded and worked up into Balls in the Hands; and after this let theſe Balls be broken to Pieces, and ſet over a gentle Fire to melt. Let the Wax be ſkimmed as the Froth riſes, and when thoroughly melted, and well ſkimmed, let it be ſtrained ſlowly through a Canvaſs Bag, and received in an earthen Pan, or other Mould, which is to be firſt rub'd over with a little Honey.

When all the Wax is run through, this is to be ſet to cool very gently in a tolerably warm Room, and when thoroughly cold, and taken out, the Bottom is to be pared off, and it is ready to be ſold.

This is the plain and uſeful Way of managing Bees, and making the moſt of their Produce. A great many very ingenious Contrivances have been made for the Curioſity of Perſons of Speculation; but nothing more than this need be regarded in Practice, when the Profit and Advantage are the Objects of the Attention.

End of the Fifth Book.

A COMPLEAT BODY OF HUSBANDRY.

BOOK VI.

Of TILLAGE.

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4. *Of the Importance and Uſe of the Leaves of Plants.*
5. *Of Accidents ariſing from the Loſs of Leaves.*
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7. *Reaſons for ſuppoſing the Nouriſhment of all Plants the ſame.*
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37. *Of harrowing.*
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39. *Of the Drill Harrow.*
40. *Of Rolling.*
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42. *Of the great Advantages of Rolling.*

IV. *Of the different Manners of Sowing.*

43. *Of Sowing in general.*
44. *Of the Depth at which Seeds are to be ſown.*

45. The

The INTRODUCTION.

Of Improvements in Huſbandry, and the Manner to undertake them.

WE now enter upon the greateſt Article within the Compaſs of the Farmer's Buſineſs: a Subject of the utmoſt Concernment and Importance to the Publick, as well as to his private Conſideration; and though the moſt continually practiſed of any, the leaſt underſtood of all.

We have throughout this Work endeavoured to acquaint our Huſbandman with the Reaſons of his ſeveral Practices, and ſhall more particularly than on any other Occaſion, attempt it here; becauſe there is no Part in which Improvements are more wanted, nor any in which they are ſo eaſily made: while at the ſame Time they are in this Article of much greater, and more general Advantage than in any other.

There is but one Way of rationally ſetting about Improvements in Huſbandry: this is by underſtanding as well as by obſerving the Practice of others, and applying what may be diſcover'd from ſuch reaſonable Experience, to other and farther Parts of the Subject.

It is for this Reaſon we have hitherto been careful to explain the Nature of the ſeveral Operations we have deſcribed, that they might ſerve not only as Guides by which to work, but as Principles whereon to reaſon: and it is by this Method, and this only, we ſhall endeavour to enlarge the Knowledge of the Farmer on this moſt important Head; that he may know in what Manner to undertake whatever Reaſon and the Conſequences of others Experience, ſhall ſhew him to be practicable, at the ſame Time that it points out the certain Utility and Advantage of it when atchieved.

We have in the five preceeding Books inſtructed him in the preparing, planting and ſtocking his Farm; omiting, as we hope, no uſeful Knowledge on thoſe Subjects: he is therefore now prepared to enter upon the Tillage of his Land; and, according to the general Information conveyed under the preceeding Heads, he is to conſider by what Method that may be ſet about to his beſt Advantage.

The old Practices of Huſbandry had their Uſe, for every Kind of Tillage adds to the natural Fertility of the Ground; but in the Courſe of an Employment followed by ſo many Perſons, in ſo many Places, and for ſo long a Period of Time, it is not to be doubted but Improvements muſt have been made. To reſolve to adhere only to the old Methods, were to ſhut the Door againſt Knowledge; and to admit all that have been propoſed among the new, were to perplex inſtead of informing ourſelves by Experience.

All Sciences are rude and imperfect at firſt, and they by Degrees refine and arrive at more Perfection. The greateſt Advances are made in them by frequent Practice; and none admits ſo continual Experience as this. Among the many who follow it, the far greater Part think no farther than to imitate the Labours of their Fathers: and of thoſe who have had the Spirit to purſue the Subject farther, too great a Part have been carried away by Fancy, and have laboured rather to eſtabliſh ſome new Syſtem, than to add to real Knowledge. Theſe are to be little regarded: but, on the other hand, too much Reſpect cannot be ſhewn to thoſe who have followed Utility in their Studies, and adhered to Truth in the delivering the Reſult of them to the Publick. 'Tis from theſe we are to hope for real Improvements in this Art; and we ſhall find in their Writings the beſt Foundation on which to build our reaſonable Attempts for the carrying Agriculture to a greater Perfection.

Among the Writers who may be uſeful in furniſhing Inſtructions for the Improvement of this Art, there is not one who deſerves greater Praiſe than Mr. TULL, the Author of the famous Treatiſe on Horſehoeing Huſbandry. This Gentleman has not only been of Service, but has done Honour to his Country, for the greateſt

Reſpect

Reſpect has been ſhewn to his Writings, by thoſe who cultivate uſeful Studies in every Part of EUROPE. The Method he has propoſed, has in it a great deal that is new, and in the higheſt Degree uſeful; but there are Faults as well as Excellencies in his Book, and while we give it the due Praiſe, we are to caution the Reader againſt too cloſe an Adherence to all its Propoſitions.

This Author had a great deal of Experience, the true and rational Source of all Knowledge on this Subject; and he had directed his Purſuits upon a new Plan. He has furniſh'd innumerable Hints for Improvements, and has carried many of them himſelf to a great Degree of Perfection: but he is too fond of the Syſtem he wrote to eſtabliſh; and the new and uſeful Diſcoveries with which his Treatiſe abounds, are clouded by vague Reaſonings, and often buried in a tedious Prolixity. This impartial Account we have thought it neceſſary to give of ſo late, and ſo conſiderable an Author, to whom we ſhall be obliged for a great deal of uſeful Knowledge on the Subject which we are to treat in the preſent Part of the Work: whoſe uſeful Diſcoveries we intend to preſent to the Reader, without his Errors or his Partiality; as they have been approved or condemn'd by thoſe Foreigners who have adopted the Practice, and as they ſtand confirmed or contradicted by Experience.

It is to this ingenious Writer that we owe the Eſtabliſhment of Horſehoeing Huſbandry practiſed in ſome Parts of ENGLAND at this Time, and with great Succeſs in many other Countries. We ſhall treat this Improvement in the Cultivation of Land carefully, as it contains more real Matter of Uſe than any other which has been made: but in our Obſervations on this Head, we ſhall form the Advice we ſhall give to the practical Huſbandman, not upon this or any one Author alone, but upon the Reſult of their ſeveral Opinions, and of the Experience of thoſe who have brought their Propoſals, in whatever Branch, to Trial.

Mr. DU HAMEL in his Treatiſe on Cultivation, has adopted what was uſeful in Mr. TULL; adding what he had farther diſcovered, and retrenching his Errors: what he did by Mr. TULL we ſhall do by him. It is thus the Writings of one Author are made uſeful by the Labours of another.

The Horſehoeing Huſbandry to be deſcribed in the ſucceeding Chapters, ſeems to have owed its Origin to a long neglected Paſſage quoted by Mr. EVELYN. The moſt celebrated Authors we find are not the moſt read; the Paſſage is this, "Take ſome of the moſt barren Earth you can find, powder it well, and expoſe it abroad for a Year, ſtirring it about frequently: it will become ſo fertile as to receive and nouriſh a Plant from the INDIES, and will cauſe all Herbs to proſper in the moſt exalted Degree, and foreign ones to bear their Fruit as kindly as in their natural Climates."

If we add to this remarkable Quotation the Contrivance for ſowing, invented by LUCATELLO, an ITALIAN, and publiſhed in the ſixtieth Number of our Philoſophical Tranſactions, which in the eſſential Points agrees perfectly with that propoſed by Mr. TULL; we ſhall find that the Foundation of Horſehoeing Huſbandry has been long ſince laid, and ſhall wonder that what had been ſo plainly delivered in Books, was not before brought to Practice.

The Uſe that has been made of theſe Diſcoveries and Inventions ſince, and the Improvements that are now carrying on in many Parts of EUROPE, by the Practice of Horſehoeing Huſbandry, ſhew the great Utility of Books in proper Hands: nor does the Inventor or the Writer deſerve more Praiſe, than the Perſon who brings what they have deviſed into real Practice.

In our Conſideration of the Tillage of Land, we ſhall fully explain the great Improvement of Horſehoeing Huſbandry, taking that lateſt invented Method firſt into Conſideration, as there will be Opportunities of explaining the Nature of Tillage more from it, than from any other; and as in order to the entering into the Advantages of this, or any other Method of Huſbandry properly, there ſhould be firſt conveyed ſome general Knowledge of the Nature of Cultivation, and of the Benefit the Earth receives from it in the affording Nouriſhment to Plants; we ſhall premiſe ſome general and particular Obſervations on this intereſting Head. For the better underſtanding of theſe, we ſhall begin with explaining to the Reader, who is not accuſtomed to theſe Reſearches, the Nature of the Vegetables themſelves.

In order to underſtand in what Manner Nouriſhment may be conveyed to the Roots of Plants, he ſhould firſt be acquainted with the Nature of thoſe Roots which are to receive it. For this Reaſon we ſhall follow the Method of thoſe who have written moſt rationally on this Subject, and premiſe to our Obſervations on the Manner of cultivating Land; ſome Remarks upon the Nature and Texture of the ſeveral Parts of Plants as they regard the preſent Enquiry; conſidering them only ſo far as their Knowledge may be uſeful to the Huſbandman.

BOOK

BOOK VI. PART I.

Of the Parts of Plants, and their Nouriſhment.

CHAP. I.

Of the Roots of Plants, their Kinds and Forms.

WE are about to explain the Effects of Tillage; and we ſhall, in order to this, firſt give ſome Account of the Parts of Plants, and of the Manner in which they are nouriſhed. Roots, ſo far as the Huſbandman is concerned in their Conſideration, may be divided into two Kinds: firſt, thoſe which ſpread under the Surface of the Ground, and ſecondly, thoſe which penetrate ſtrait down: the firſt of theſe we ſhall call ſpreading Roots, and the other tap Roots, and there will need here no farther Diſtinction.

The tap Roots plunge perpendicularly into the Earth, the others, according to their Name, diſperſe themſelves every Way, at a ſmall Diſtance under the Surface.

Thoſe Roots which firſt ſhoot from the Seed of a Plant, are always of the perpendicular Kind: they plunge themſelves ſtrait down into the Earth, and continue piercing deeper and deeper, till they find it too hard for their proceeding farther. In Places where the Soil is ſoft and deep, theſe Roots penetrate much farther down than is imagin'd. They will reach many Yards into the Earth, if uninterrupted and uninjur'd.

When theſe Roots are hurt or cut, whether by Accident or Deſign, they change their Nature, and each divides into many others. This is an Obſervation not eaſily made in its full Extent, in Plants growing in the Earth, becauſe they cannot be taken up perfect; but Experiments made on ſuch as are rais'd in clear Water, ſet it in a very ſtrong Light. Such Trials have been made by the FRENCH in great Numbers; they may be repeated and enlarged with Eaſe; and will not fail to let a great deal of new Light into the Doctrine of Roots.

All tap Roots puſh out certain Branches, or Fibres, which ſpread in an horizontal Direction: and theſe Branches are the more vigorous, the leſs they are buried in the Earth. The moſt ſtrong and ſerviceable therefore ſpread always near the Surface of the Ground; and within that Depth of the Soil which is mov'd by the Plow and other Inſtruments of Huſbandry.

Theſe are of the Nature of thoſe Roots which we call horizontal. Some Plants have, in this Manner, a main Body which runs ſtrait down, and Fibres growing from it: others conſiſt of theſe ſpreading Fibres only, they run often to a very great Diſtance from the Plant; but in this Caſe they become ſo ſmall that they are hardly to be diſcovered; eſpecially when they are of the Colour of the Earth among which they lie, as theſe very ſmall Fibres commonly are.

A Carrot appears to the incurious Obſerver to have only one Root, which is long, thick, and perpendicular, with a few ſhort Fibres about it; yet it is found, on a more ſtrict Examination, to ſpread a great Number of very fine and ſmall Fibres to a great Diſtance every Way. Theſe are its horizontal Roots, they are of the ſame Colour with the Earth among which they run, and therefore they are not to be diſtinguiſhed but by a very ſtrict Examination.

This is the Caſe with other Plants, as well as the Carrot, and nothing is eaſier than to be convinc'd of it by an Experiment which Mr. TULL propoſes. Let a Piece of new and firm Earth be dug in Form of a long and narrow Triangle. Let the Length of this Piece of Ground be twenty Yards, its Breadth, at the Bottom of the Triangle, twelve Feet, and at the Top let it terminate in a Point. In this Piece of Ground let there be twenty Turnips rais'd from Seed, and let the Ground be kept well hoed. Now when theſe Roots are grown, if the Turnip that ſtands firſt, or in the narroweſt Part, at the Top of the Piece, be as large as that which ſtands at the Bottom, in the Middle of the broadeſt Part, it will be a Proof that the horizontal Fibres ſent out by theſe Roots, ſpread very little in ſearch of Nouriſhment; for they cannot eaſily go beyond the Part that is dug. If the Turnips be gradually larger and larger from the Top, or narrow Part, to the Bottom, it will ſhew that a Turnip ſends out ſmall Fibres to a great Diſtance in ſearch of Nouriſhment, and that it grows in proportion to the Diſtance they extend. This would ſhew that a Turnip ſends out Fibres, to at leaſt ſix Foot diſtance every Way, for there is nothing elſe to make the laſt Root bigger than the others; and twelve Foot is there the whole Width of the Ground that is dug. But if the firſt Root, that is, that which grows in the narroweſt Part be ſmall, and thoſe Roots which follow it in a Line to the broader Parts, grow gradually larger till about the Middle, and from thence to the broadeſt Part, continue much the ſame in Size and Vigour; then it will be found that a Turnip ſpreads its Roots three or four Foot every Way, according to the Breadth of the Piece of Ground where they have their full Bigneſs: and that it ſends them no farther.

The Roots do not penetrate, at leaſt not in any conſiderable Manner, into the hard Ground at the Edges of this Piece, where it has not been dug. This Experiment therefore, ſuppoſing this the Event, would ſhew the great Uſe of digging, hoeing, or plowing about theſe Roots, for furniſhing them with Nouriſhment: and it would

ſhew, that be the Earth ever ſo well prepar'd, it is of no Uſe to them at a greater Diſtance than three or four Foot every Way; therefore we ſhould ſee by this, how much Space is uſeful to be left about a Turnip.

This Experiment may be extended to other Roots as well as Turnips, indeed to all other Plants whatſoever; and it will ſhew, ſufficiently for all uſeful Purpoſes, to what Diſtance they ſeverally ſpread their Fibres, and how far the Earth is to be cultivated and left vacant for their Service; on this depends the great Advantage of Horſehoeing Huſbandry, as will be ſeen in a ſucceeding Section.

CHAP. II.

Of the Extent of the Roots of Trees.

Mr. Tull obſerves, that the Roots of the white Thorn Shrubs in an Hedge, which has a Ditch before it in the uſual Way, penetrate below the Bottom of the Ditch, run under it, and riſe again on the other Side, to the richer Soil which lies near the Surface, eſpecially if it have been wrought; and then ſpread horizontally for more Nouriſhment.

The ſame Obſervation has been made by Mr. Du Hamel, with Reſpect to a Row of Trees, which ſeem'd to be kill'd by a deep Ditch that was dug at a little Diſtance from them, in order to prevent their Roots from ſpreading into the neighbouring Ground; but theſe Trees, in a little Time, ſent down their Fibres below the Bottom of the Ditch, which, when they had paſs'd, they roſe again toward the Surface, and ſpread themſelves through the Soil that was wrought, to a great Diſtance every Way. The Trees had faded at firſt, upon the digging of the Ditch, but as ſoon as their new Roots had got into the good Ground, on the other Side, they recover'd.

If a Ditch be dug lengthwiſe, at a ſmall Diſtance from a young Tree, and fill'd up with good Earth, the Roots of the Tree will ſoon get into it, and will follow the Direction of the Ditch, extending themſelves in the good Earth that fills it to a great Length.

In the ſame Manner when Trees are planted too deep in the Earth, they languiſh till they have ſent up their Roots into the upper Part of the Ground, where it is ſtir'd by Culture; but as ſoon as they have got there they revive and flouriſh. The Folly of planting Trees too deep, appears very plainly from this Obſervation; and when that Fault has been committed, and a Tree is ſeen to ſuffer by it, the beſt Method is to take it up and plant it again ſhallower.

I have obſerved that of late Years the young Trees planted about London ſucceed worſe than formerly, a good Part of them dying altogether, and others loſing their Tops: upon examining into the Reaſon, I have generally found it to be the planting them too deep. One would ſuppoſe all the Arts ſhould be beſt underſtood near the Metropolis, but that of planting is not: this Hint may perhaps be uſeful.

Theſe and many other Obſervations which might be cited, prove that the Roots of Trees ſpread to a great Diſtance, when they get into Ground that has been ſtir'd, and that they will run a great Way, and take ſtrange Courſes to find it. The Roots of all Plants, Corn and Graſſes, do the ſame. Leaves are the Organs of Tranſpiration in Plants, Roots are thoſe deſtin'd for attracting and drawing the Nouriſhment. It is evident that, in order to the Growth of a Plant, more Sap muſt be taken in than is tranſpir'd; and as all Plants encreaſe in Growth, it is plain this is done. If we look upon the great Extent of Surface in the Leaves of Vegetables, the Organs of Tranſpiration, we cannot doubt but that the Fibres of their Roots, which are the Organs of Suction, muſt be extended in a like Manner. Reaſon ſhews that it ought to be ſo, and late Obſervations and Experiments ſhew that it is. It has been aſſerted that they run out in Length as much as the Leaves expand in Surface, although they are not ſo obvious to the Eye.

But ſome Reſtriction is to be obſerved in this Aſſertion. Plants tranſpire only in the Day: on the contrary, during the Night, they revive and imbibe the Dews and Rains, and what they thus receive contributes greatly to their Growth and Encreaſe. We are to add alſo, that there is no Proof that either the Tranſpiration or Suction in Plants are proportioned to the Surfaces of the Parts; and for ought that is hitherto known, an Inch of Root may imbibe a larger Quantity, than an Inch of Leaf tranſpires.

But, however this may be, it is certain that the Roots of Plants extend to a great Length, much beyond what has heretofore been imagined.

CHAP. III.

Of the Manner wherein the Roots of Plants imbibe their Nouriſhment.

In the ſame Manner as the Lacteal Veſſels in an Animal have their Openings in the Inteſtines, for taking in the Chyle, the Roots of Plants have their Openings in their Lacteals, or more properly in their Sap Veſſels, on their Surfaces. But there is yet a great Difference, Animals can go about to ſeek their Food and fill their Stomachs and Inteſtines, while Plants are obliged to ſpread their Roots in the Soil, where they ſtand to imbibe their Nouriſhment. It is neceſſary, for this Reaſon, that their Roots ſhould extend to a conſiderable Diſtance, otherwiſe they would quickly exhauſt the Earth that lies juſt about them.

We may carry this Compariſon ſomething farther: we obſerve that the Preſſure of the digeſted Food againſt the inner Surface of the Inteſtines, contributes, together with the periſtaltick Motion of thoſe Parts, to the Introduction of the Chyle, or nouriſhing Juice of Animals, into the Lacteals: and in the ſame Manner the Efforts which theſe ſmall Roots of Plants make in extending themſelves among the ſmall Particles of fine Earth, the Preſſure of the wrought

Earth

Earth againſt the Roots, and the Re-action of the Roots againſt the Earth, as they encreaſe in Bigneſs, and as that cloſes after the breaking by Culture, anſwers, in ſome Degree, to thoſe Motions in the Inteſtines, ariſing from their Reſiſtance and their periſtaltick Undulation.

To this, which is an Obſervation of Mr. Du Hamel, we may add another great Article in the Proceſs of the Roots of Plants obtaining their Nouriſhment; which is the Effect of Heat. There is Heat in all Things in the Roots which are to receive Nouriſhment, and in the Earth which is to give it: and this Heat differs in Degree almoſt every Moment, as is ſeen by Experiments. Things expand with Heat, and they contract with Cold: therefore they are expanding and contracting, more or leſs, every Moment. This gives Motion and Preſſure between the Roots and the ſmall Particles of Earth continually, and this will much better than any other Means ſhew the Analogy there is between the Nouriſhment of Plants and Animals.

This is indeed the true Source of the Nouriſhment and Growth of Vegetables; and all that has been diſcovered by Mr. Tull, and thoſe who have followed his Train of Reaſons, joins to confirm it. Heat is the Cauſe of all Motion, and is doubtleſs the immediate Agent in the Hand of the Creator, for the keeping the whole Frame of Things in Order.

What has been obſerved of the Action of the Particles of Earth upon the Roots of Plants, ſhews, in the ſtrongeſt Light, the Uſe of ſtiring and breaking the Ground by Culture, that the Roots may the more eaſily make their Way through it, and that it may preſs them as it cloſes after the breaking.

Whatever be the Reaſon, Experience ſhews that Roots of Plants are always in the beſt Condition for obtaining Nouriſhment, where the Soil in which they run is light and fine. If two young Trees be pulled up, the one of which has grown in a light, and the other in a heavy and hard Soil, we ſhall find, on Examination, that the Tree which had grown in the heavy Soil, has but a ſmall Number of Roots, and thoſe large and ſtrong; whereas that which has grown in a light Soil has a vaſt Multitude of Roots, and all ſmall and fine: and to purſue this Subject farther, let a Tree be rais'd in pure Water alone, where there is no Reſiſtance at all againſt the ſpreading of the Roots, and we ſhall perceive that they are all nothing more than the ſlendereſt Filaments.

The Culture of a Soil therefore plainly occaſions the Roots of whatever is ſown in it, to be much more numerous, and finer, than they otherwiſe would have been; and Experience ſhews alſo, that it is not from the large and thick Roots, but from theſe ſmall and fine ones, that Plants receive their principal Nouriſhment.

It has been ſaid, in a preceeding Chapter, that when a Root is cut it alters its Courſe and Direction. This is to be explained farther, and it gives the greateſt of all Proofs, of the Benefit Plants receive from the digging about them. When a Root of a Plant is cut off, it does not extend any farther immediately, and in its Form, or Courſe in Length; but it ſends out a great Number of ſmall and fine Fibres. Here are therefore, from the cutting off one Root, a Number of others produced, which are of the proper Kind for drawing Nouriſhment, and the Ground is at the ſame Time made ready to receive them, when this is done in digging about the Plant. When the Huſbandman digs, or any other way divides the Ground near his Plants, he cuts or breaks off a great many of their Roots: and inſtead of hurting them by this, we ſee from every one ſo broken, there grow a great Number of others more uſeful than the firſt.

CHAP. IV.

Of the Importance and Uſe of the Leaves of Plants.

LEAVES, we have obſerved already, are in Plants, the Organs of Tranſpiration, theſe are ſo neceſſary to the greateſt Part of Vegetables, that they cannot ſubſiſt without them. If we pull off all the Leaves of a flouriſhing Tree, it will commonly die. This indeed is not always the Conſequence of ſuch Loſs; for we ſee Trees ſometimes entirely rob'd of their Leaves by the devouring Caterpillars, and they recover: but that is done gradually, and moſt Trees will die if ſtrip'd at once. The Effect however may depend alſo on the Circumſtance. In ſome Conditions a Tree may be able to bear the Loſs of all its Leaves, and in others not.

Grew has ſhewn, that the Leaves of a Tree which are to burſt forth in Spring, are formed in the Buds the preceding Autumn: they are at that Time very ſmall, but they are proportioned to their Uſe.

Beſide theſe, which may be called the autumnal Leaves, there is a Reſerve in Plants for others: for when Mulberry-trees have been ſtrip'd of their Leaves to feed Silk Worms, in the Beginning of Summer; or when other Trees have been render'd naked by Inſects, there grow another Quantity in the Place. This is a Proviſion of Nature in Favour of Trees and Plants, that they may not always periſh by the Loſs of ſo abſolutely neceſſary Parts.

Grew diſcover'd, in examining the Leaves of Plants, that beſide the Network of longitudinal Fibres, which form the Courſe of the Leaf, there are a Number of Veſicles fill'd with Air. From this Obſervation many have concluded, that the Leaves were the Lungs of Plants; that they receiv'd the Air from the Atmoſphere; that this Air made its Way through the Plant down to its Roots; and that it there produced an Effect upon the Sap receiv'd from the Earth, of the ſame Kind with that it occaſions in the Blood of Animals.

Mr. Papin has alſo publiſhed a great Number of Experiments, which ſeem to favour this Doctrine; he ſays, That on putting a whole Plant into the Receiver of an Air Pump, it periſhes immediately, on exhauſting the Air; but that if the Roots alone be immers'd in the Receiver, and the Stalks and Leaves remain in the Air, which may be eaſily contrived by letting them out, and ſecuring the Opening with Wax, the

Plant

Plant will remain alive a long Time. This was propoſed by the Author, and has been received by the Publick as a Proof of the Reſpiration of Plants, and that their Leaves are the Organs.

The many Experiments made by Dr. WOODWARD, Mr. MARIOTTE, and Dr. HALES, prove abundantly that the Leaves are Organs of Tranſpiration, and that the greateſt Part of the Sap imbibed by the Roots, eſcapes through them. Indeed if we compare the Quantity of Sap that is taken in by the Roots and other Organs, with the Quantity that is let off by Tranſpiration, we find that the Remainder is what is left in the Subſtance of the Plant, and that if there be any other Account in the Sap, it is inconſiderable.

We know alſo that the Leaves of Plants do imbibe the Moiſture of Rains and Dews, and that this is very beneficial to the Growth. This is a plain Uſe of the Leaves; but we may extend their Benefit a little farther.

It is ſaid that the nutritive Juice receiving a certain Preparation in the Leaves, is thence diſtributed throughout the whole Plant for its Nouriſhment: but this ſuppoſes the Circulation of the Sap in Plants, which is a Thing not proved by any Experiments: indeed it is a Fact very much to be doubted, not only becauſe it has been advanced without Proof, but becauſe there do not appear to be two Kinds of Veſſels in Plants, as Veins and Arteries in Animals; the one of which ſhould carry up the Sap, and the other bring it down again. All that there ſeems to be in the Motion of the Sap of Plants, is a Kind of tremulous and uncertain Undulation, owing to the different Temperature of the Air.

Thoſe who argue for the Circulation of the Sap, ſay, That according to the other Doctrine, it muſt be ſuppoſed to be prepared by Degrees as it riſes in the Plant; and that there is not any Experiment or Fact to prove, that it is in any greater Degree of Perfection in the upper than in the lower Parts of it. And it muſt be allowed ſurprizing, that the Sap received into the Roots of Plants, ſhould be at once ſo perfectly prepared as to ſerve all the Purpoſes of Vegetation, and be able to ſupply with proper Nouriſhment the ſeveral Parts of the Vegetable. Upon this Plan of Reaſoning, and theſe Objections to the other Doctrine, the Aſſerters of a Circulation of Sap ſay, that it is altogether neceſſary for explaining Vegetation, to allow that it paſſes through the Leaves, returns thence through the Body of the Plant, and afterwards goes to the Leaves again; as the Blood in Animals returns to the Lungs, after having gone through every Part of the Body. This is a very ſpecious Reaſoning, but there wants Experiment to confirm it; and, on the contrary, innumerable Facts ſtand directly againſt it.

The Reader ſees what is advanced on both Sides, and the Reaſons; but he will find the Tranſpiration of the Leaves all that is proved with Certainty.

Whatſoever be the particular Office of the Leaves of Plants, Experiments ſufficiently ſhew, that they are of Benefit, and even of the greateſt Uſe and Neceſſity to the whole; this is the Huſbandman's material Conſideration.

If one cut off half, or two thirds of the Leaves of a young Tree that is full of Sap: we ſhall find that it will loſe its Sap in three or four Days after. The Bark which before would eaſily ſeparate from the Wood, will then ſtick firmly to it; and it will be impoſſible upon the very Day after the Cutting off the Leaves, to perform many of thoſe Operations in Gardening upon it, which might have been done while the Leaves were there. The Difference therefore made by taking away the Leaves only in part, is very evident to the Senſes.

A Willow, a Poplar, or any other Tree, but particularly thoſe of the ſoft Wood Kinds, will grow and flouriſh for a great many Years, and continue with a ſound Trunk, provided it be left to the Courſe of Nature, and permitted to keep its Head and its Branches; but, on the other hand, when one of theſe Trees has the Head cut off for ſhrowding, the Trunk quickly decays and grows hollow. This is moſt frequently owing to the Wet that gets in at the Parts where the Head at firſt, or the Shrowds afterwards are cut off; but if ever ſo much Care be taken in the Shrowding, the Tree does not continue ſound as it would have done in its natural State. No Pollard Tree ever continuing firm and good in the Trunk, any proportionable Time to the ſame Kind of Tree left with its Head and top Branches. The Heads and high Branches of Trees are what carry the great Quantity of the Leaves; it is therefore plain from this Circumſtance, that the Leaves of Trees preſerve the very Trunk in Soundneſs.

On the ſame Principle it is, that the Injuries of the Leaves of Corn affect the Ear. We ſee as ſoon as ever they are attacked by any Diſorder, the whole Plant declines. This is a Proof like the former, that the Leaves are a Part of the utmoſt Importance to Plants of all Kinds, and that the healthful State of the whole depends entirely upon them. Not only the whole Plant ſuffers when they are taken off, but when they are only diſeaſed.

From all this it appears, that the Leaves of Plants, in whatſoever Senſe we conſider them, are of the utmoſt Importance to the whole: and as the Leaves are thus important, ſo are the ſmall Branches that ſupport them. It is for this Reaſon that Cutting, eſpecially if it be done too cloſe, is certain Deſtruction to the FRENCH Furze, and many other Shrubs; and to the ſame Principle is to be referred the vaſt Damage that is done to the Saintfoine, Lucerne, and Clovers, when they are permitted to be eat down too cloſely by Cattle; and eſpecially while they are young. The Injury is of the ſame Nature with that done to Trees by ſhrowding: they ſuffer by it extreamly while tender, though when their Roots are well formed, and have ſpread far into the Ground, they recover it.

It is a common Cuſtom among our Huſbandmen, to turn in their Sheep upon their Corn Fields, when the young Blade is too rank: we ſhall in a ſucceeding Part of this Work, adviſe ſome Reſtrictions and Limitations to this Practice; and they will be founded on this Principle, of the great and neceſſary Uſe of the Leaves

to all Plants, and the Injury of cutting, or takeing them off.

From theſe Conſiderations of the principal Parts of Plants with Reſpect to their Growth and Nouriſhment, the judicious Huſbandman will naturally be led to the Reaſons of thoſe Effects he ſees ariſe from Culture: and underſtanding what he ſees, he will be able rationally to advance farther. We ſee here that the Roots of Plants differ in their Forms, and we ſhall find upon farther Examination, that they alſo differ in their principal Uſes. The tap Roots which penetrate deep into the Body of the Ground, ſerve to keep the Tree or Plant firm in its Place, and thoſe which ſpread horizontally in the upper Coat of the Earth, that is, the Soil, which is the Seat of Culture, ſupply it with Nouriſhment. One Kind therefore may be moſt needful to one Sort of Plants, and the other to another; though every Plant in ſome Degree requires, and has the Aſſiſtance of both. Nature has given them according to their ſeveral Occaſions, the Oak and the Walnut have vaſt tap Roots to ſecure them from the Violence of the Winds, which elſe taking ſuch hold againſt their ſpreading Tops, would tear them up out of the Ground; while humbler Plants have the horizontal Roots moſt conſiderable, for ſupplying their uſeful Products whether in Ear or whatever other Way with Nouriſhment.

Nature anſwers different Purpoſes by the ſame Means, and often employs theſe tap Roots to draw Nouriſhment; for they are common in many Plants which have no great Head, as Saintfoin and Lucerne, and ſeveral others that might be inſtanced; but in the general Courſe of Things, it is the other Uſe to which they principally ſerve. In the ſame Manner, the ſpreading Roots which are particularly deſtined to ſupply the Plant with Nouriſhment, aſſiſt alſo, and that very greatly in keeping it in its Place.

With Reſpect to theſe ſpreading Roots, it will be found on Examination, that they grow to the greater Length as they run nearer the Surface of the Ground, becauſe they are there moſt within the Reach of Rains and Dews, and moſt under the Influence of the Sun's Rays: they alſo extend farther and wider in Proportion to the Condition of the Ground, and always run fartheſt where the Soil is moſt broken by Culture: for 'tis plain from repeated Experience, that all theſe Roots run out in Length, and multiply, in Proportion to the Eaſe with which they make their Way: and they always puſh themſelves with the more Eaſe, the more the Ground has been broken and rendered ſoft by Culture.

As to Leaves, we find that they are of the utmoſt Importance to the Plant; and that on a double Account; as they diſcharge the Redundance of thoſe Juices that have been taken in by the Root, and as they contribute to its abſolute Increaſe alſo, by imbibing nouriſhing Matter from Rains and Dews themſelves. Theſe are two very different Offices to be performed by the ſame Organs, but we plainly perceive that it is thus Nature reciprocally uſes them. They diſcharge the Redundances by Day, and they inbibe Moiſture during the Night.

The Importance of the Leaves to the Plant is ſhewn abundantly by the Experiments and Facts that have been here mentioned; but whether any one of the Syſtems that have been propoſed be altogether true, at leaſt whether it contain the whole Truth, and explain the whole Uſe of thoſe Parts, is not yet determined. We have for this Reaſon delivered them all, that the Reader may ſee in one ſhort View, what has been advanced for either Syſtem by its ſeveral Advocates, and may for himſelf determine by what he ſhall ſee in Practice, which is moſt right; or how far either.

The whole has its Uſe in the Practice of Huſbandry. What has been laid down concerning Roots, is a Matter of immediate Concern in the Cultivation of every Kind of uſeful Growth whatſoever; and the Knowledge of this Importance of Leaves will be of no leſs Conſequence in the Conſideration of many of thoſe particular Vegetables the Cultivation of which will be delivered in our Seventh Book; and which not being ſo univerſally the Objects of the Farmer's Care as the common Kinds of Corn, are not ſo well underſtood with Reſpect even to the common Articles of their Management.

CHAP. VI.

Of the Nouriſhment of Plants.

NOTHING is more difficult than to ſay, what is the Nature of the nutritive Juice of Plants: no Queſtion has been more debated by Philoſophers, and none with leſs Succeſs. It would be natural to think that this might be diſcovered by the Nature of the ſeveral Subſtances we uſe as Manures; but in Reſpect of theſe, we ſee the Effect only: this is very plain and obvious, but nothing is more hidden or difficult to find than the Cauſe.

We have ſhewn in our Second Book what are the ſeveral Subſtances uſed as Manures, and from many of theſe one would be led to ſuppoſe, that the Sap which is ſo evidently increaſed and enriched by them, conſiſted of Salts and Oils, and other Things ſuch as Chymiſtry is able to extract from theſe ſeveral Ingredients: but then the Effects of many of the more ſimple Kinds of theſe Manures, which are often equal to thoſe of the moſt ſeemingly powerful, ſhew that this is not the Caſe: and we are the more confirmed in this, when we conſider that bare Sands will ſupport many Plants; and that many others may be raiſed in pure Water: and that in either Caſe they have the ſame Qualities and Virtues with thoſe of the ſame Kind raiſed in Earth, dreſſed with the richeſt Manures. This leads one to imagine, that the Sap, or abſolute Nouriſhment of Plants, is in itſelf a Thing much more ſimple than it would be natural otherwiſe to think; and that it obtains all this Variety of Taſtes, Smells and Qualities from the Organs of the Plant.

Mr. Tull is of Opinion, that the Nouriſhment, or as he expreſſes it, the Food of Plants, is nothing but the Particles of Earth reduced to

a very fine Powder. Others have had Recourſe to Salts as the great Article of the Nouriſhment of Plants; and many have called in Fire, Air, Water and Earth, to ſerve the ſame Purpoſe; ſome prefering one and ſome another, according to the Syſtems they choſe to favour. But this has all been found imaginary, from the Reſult of frequent Trials; and if we can ſuppoſe the Matter of pure Earth capable of being reduced to a State of Solution in Water, or but of being ſo broken and divided by it, as to be in a Condition to be received into the fineſt Veſſels of Plants, we ſhall adopt an Opinion much more agreeable to Reaſon, as well as to the common Courſe of Things, in ſuppoſing Earth itſelf thus reduced to exceedingly ſmall Particles, to be the very Matter of the Nouriſhment of every Thing that grows on it.

We find that all Vegetables are finally reduc'd to Earth by Corruption, and to what ſhould a Thing be reduced by this, but to that Subſtance of which it originally conſiſted. Probably the Manures we add for the Melioration of Earth, be they of what Kind they will, ſerve to no other Purpoſe but the preparing that Earth for entering theſe fine Veſſels; and the utmoſt Effect of them may be nothing more than rendering the Earths with which they are mixed, fit for that Purpoſe.

For Inſtance, all the rich Manures contain a Salt: now theſe Salts may have an Effect in dividing the Particles of Earth, and thus preparing them for affording nouriſhing Plants. Again, Water may ſoften theſe Particles thus rendered extreamly ſmall, and Air and Fire may put them in Motion. In this Light, Fire, Air and Water may aſſiſt in the Growth of Plants, but it is Earth that affords the ſubſtantial Part, or Matter of their Nouriſhment. The Plant may be killed by taking away the Effect of Fire, Air, or Water, but without Earth it could not have its very Subſtance; perhaps it cannot live without the others; but without this it cannot exiſt.

The mention of Salts, Fire, Air and Water on this Occaſion of the Nouriſhment of Plants, is unavoidable, becauſe all who have read at all upon the Subject, have been accuſtomed to hear of them as the Sources of Nouriſhment jointly or ſingly; but no Knowledge was ever conveyed upon ſuch Principles. They are neceſſary to be named becauſe they have Effects on Plants; but nothing is ſo idle as to ſuppoſe that they eſſentially feed and ſupport them. Water indeed, in the Condition we have it, will do this, but we know Water contains Earth; and it is unqueſtionably by this Earth that is in the Water, that Plants are nouriſhed which grow in it.

We do not mean by Earth, when we ſpeak of it as the Food and Nouriſhment of Plants, that ſimple elementary Subſtance which the Chymiſts mean by the ſame Word, underſtanding by it Earth diveſted of all other Principles: on the contrary, we can extract all thoſe Principles from Plants, and we mean no other Thing by Earth on this Occaſion, than ſuch as compoſes a fine Soil, ſuch as it is found on the Surface of Land, and is called Mould.

That this is natural to Plants is evident, becauſe it will not injure them, which all the other Things pretended to afford them Nouriſhment will. Too much Salt will prevent their Growth, too much Water will kill them, and too much Air and Heat will dry them up; but too large a Quantity of Earth never does them any Harm. Indeed they may be injured by being planted too deep, becauſe their Roots may be buried in ſuch a Manner, as to be out of the Reach of the Air, Rains and Dews, and of the Influence of the Sun's Rays; theſe being neceſſary to their Growth, although they do not afford them the real Nouriſhment.

That abſolute Earth is the Nouriſhment of Plants appears from this, that ſuch as naturally grow in the moſt diſtinct and diſtant Places, are capable of being ſupported by any Earth indifferently in either. Thyme will not grow in a Bog, becauſe Thyme does not love much wet, but the Earth of the Bog is not in Fault, for that will feed it, if diveſted of its abundant Water; and removed to another Place. Let a Parcel of the Earth of a Quagmire that bears nothing but Ruſhes, be dried by the Sun, and placed at the Top of a Hill, and Thyme will grow in it; and in the ſame Manner let the Earth dug from a Hill be buried in a Quagmire, and when it is well wetted, Ruſhes will grow in that. 'Tis not therefore the Earth that differs: that is capable to ſupport any Plant: 'tis only altered by the Quantity of Water. The Plants of AMERICA ſucceed very well in the Earth of ENGLAND, as we ſee every Day in our Stoves and Green-houſes. If they are from a hotter Climate, they muſt have a proportioned Degree of Heat given by Art, but the Earth does perfectly well. We have argued in this Chapter for Earth being the Food of Plants, and we ſee in theſe Inſtances, that good Earth will ſupport and nouriſh all Kinds of them; provided they have the neceſſary Degree of Heat and Moiſture: this ſeems very greatly to ſupport the Opinion.

People of Curioſity tell us, that Water, and even Air, are capable of being fixed and converted into Earth; and ſome have imagined this of Water particularly, from its ſo freely feeding of Plants: but that is owing to the Earth it contains, as mentioned already. In fine, if we can as at firſt ſaid, get over the Difficulty of Earths not being diſſoluble in Water, or can ſuppoſe that without Solution it is capable of being rendered ſo fine, that it may enter the fineſt Veſſels of Plants; there appears great Reaſon on the Side of this Opinion, that Earth of an extream Fineneſs is properly and truly the Food or Nouriſhment of them: underſtanding by this Term Earth, ſuch as we find it in the Soil.

The ſucceeding Diſcourſe on Tillage will ſhew the Neceſſity we have been under of entering thus far into the preſent Subject; for otherwiſe, much of the practical Part would have appeared ſtrange and ill-founded: but whether Earth be in Reality the Nouriſhment of Plants or not, is to the practical Huſbandman no important Matter. If we can upon theſe Principles lead him to a Method of giving greater Fertility to his Land, we ſhall not be uneaſy upon the Sub-

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ject of that Uncertainty which reigns, and always will reign in the Enquiries into the Myſteries of Nature: the Explanation of the Nouriſhment of Plants being one of the greateſt.

CHAP. VII.

Of the Reaſons there are for ſuppoſing the Nouriſhment of all Plants the ſame.

IN Conſequence of what has been delivered as moſt probable in the laſt Chapter concerning the Nouriſhment of Plants, a Queſtion will naturally ariſe, Whether we ſuppoſe that the different Sorts of Plants take in the ſame Food, or the ſame Matter for their Nouriſhment, whatſoever that be? This is indeed a very difficult Queſtion, but it is very neceſſary to be conſidered for the Uſe of the practical Huſbandman: for on the Anſwer depends his Knowledge how to act in the varying or continuing the ſame Crops upon the ſame Piece of Ground.

We imagine that the Nouriſhment taken in by all Plants is the ſame, for we ſuppoſe that Nouriſhment to be no other than Earth in very fine Particles carried into their Veſſels by Water. But as a great deal of the Huſbandman's Practice in his tilled Lands will depend upon the Certainty of this Point, we ſhall not attempt to force this Opinion upon him; but ſhall lay before him the Objections that have been made, or may be made by others againſt it, and propoſe at the ſame Time our Anſwers: when he has the whole before his Eye at once, he will be beſt able to determine, whether he ſhall adhere to our Opinion, or to that of others.

Mr. Tull is the Founder of this Opinion, that the Food or Nouriſhment of Plants, is Earth; and conſequently, that all Plants take in the ſame: the Generality of Writers have adopted a contrary Doctrine: they ſuppoſe that every Plant draws from the Earth for its Nouriſhment certain Juices that are proper for it, and no other, never taking in the Earth itſelf at all.

On this Principle is founded the Opinion ſo common among the Generality of Writers, that a Piece of Ground may be exhauſted for one Kind of Plant, and not for another; and on this Opinion is ſuppoſed to be founded the Cuſtom of the practical Huſbandman, of every Year changing his Crops; the Succeſs of which Practice is alſo urged in Favour of the Opinion. This is a very ſpecious Reaſoning.

Barley, ſay they, exhauſts the Ground much more than Oats, when it is to be ſown afterwards with Wheat. This is a Fact, and on this they found their Opinion, that the Juices taken for the Nouriſhment of Barley, are more like thoſe required by Wheat, than are the Juices drawn by Oats.

In the ſame Manner they add, When a Piece of Ground has been a long Time occupied by one Kind of Tree, if ſome more of the ſame Sort be planted in it, they will ſucceed very poorly; but if Trees of ſome other Kind be ſet, there will be Hopes of better Succeſs.

Theſe Facts which we ſtate in their full Strength, allowing their Truth, ſeem at firſt Sight to argue againſt the nouriſhing Matter of all Plants being the ſame: but on the other hand, there are a Multitude of other Obſervations founded in the ſame Manner on Facts, to be produced, which ſtand as fairly for the Opinion we propoſe, of the Nouriſhment of all Plants being the ſame: and theſe which ſeem ſo ſtrong againſt it may be refuted.

The firſt is very fairly propoſed, and therefore may be diſtinctly and exactly anſwered. Barley does exhauſt the Ground, on which Wheat is afterwards to be ſowed, more than Oats, as is ſeen by the ſucceeding Crop. But the Fact is no more than this, that Barley exhauſts Ground more than Oats, in general: there is nothing in the ſuppoſed Particularity. Wheat requires a great deal of Nouriſhment, and it therefore ſucceeds beſt after Oats, not becauſe the Nouriſhment drawn by Barley was of the ſame Nature that Wheat required, or that drawn by Oats different; but becauſe the Barley had drawn in more Nouriſhment, and therefore had left leſs in the Ground. The Fact is plain, for we know Barley requires more Nouriſhment than Oats, for Oats will grow on poorer Land: and this is the whole Matter. The Fact propoſed is true, but the Cauſe miſtaken.

The other Objection, if it were ſtated more particularly, would be as eaſily anſwered. Oats requiring little Nouriſhment, will ſucceed after Crops that require more; and that when ſuch Crops would not: in the ſame Manner ſome Trees require more, and ſome will thrive with leſs Nouriſhment. When one Kind of Tree that requires a great deal of Nouriſhment has exhauſted a Piece of Ground, a freſh Quantity of the ſame Trees planted on it will not thrive, becauſe the former had exhauſted it: nor would any other Kind of Trees ſucceed, that ſhould require alſo a great deal of Nouriſhment. But if a new Kind of Trees be planted there which require leſs Nouriſhment, they will ſucceed, becauſe though there be but little, it may be ſufficient for them as they require but little.

A great Part of the Objections which are propoſed againſt uſeful Diſcoveries, might be anſwered by more ſtrict Enquiries in this Manner; they have had their Riſe in Error, and they have their appearing Weight only becauſe they are ſtated imperfectly. To ſee the whole of the Subject is to be ſatisfied that they ſignify nothing.

CHAP. VIII.

Other Objections to the Nouriſhment of all Plants, being the ſame anſwered.

THE firſt and principal Difficulty they raiſe who ſuppoſe every Plant to draw a peculiar Juice for its Nouriſhment out of the Earth is, that it does not appear probable the ſame Matter, and that alike in all Reſpects, ſhould be able to ſupport and give Increaſe to ſuch a vaſt Variety of Plants as we ſee, and thoſe ſo different in the moſt eſſential Points from one another; in their Forms, Taſtes and Virtues.

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This, like the reſt, has a ſpecious Appearance: but let it be conſidered notwithſtanding, fairly. There is no Doubt but that the ſmall Particles of Earth which we ſuppoſe to be the Nouriſhment of Vegetables, aſſume different Forms in different Plants; but this is no Proof that the nouriſhing Matter may not be altogether the ſame in the Earth, though altered in their Veſſels.

Experience alſo joins to ſhew, that the Nouriſhment is the ſame for all Plants, from what is ſeen in their Growth among one another. If a Lettice, for Inſtance, draws from the Earth a particular Juice for its Nouriſhment; and that Juice be different from what is drawn by a Plant of Succory, then it will follow that a Lettice ſet among Succory Plants, muſt flouriſh better than when ſet among other Lettices; nay, it ought in this Caſe, if the Doctrine of different Juices for every Plant were true, to flouriſh as well as if no other Plant at all were near it: but let this be tried, and the Reſult will be quite otherwiſe. A Lettice planted among Succory will flouriſh juſt as much as if it ſtood among other Lettices; not at all more; and it will not grow nearly ſo faſt, as if no Plant were by it. This ſhews that the Nouriſhment of Lettice and Succory are the ſame, and that Plants of any Kind exhauſt the Ground, and rob thoſe which are near them of Nouriſhment, as much if they be of different Species, as if of the ſame.

That the Nouriſhment of Plants, whatſoever it be, undergoes in their Veſſels that Change which gives it the particular Taſte, Colour, and Form which belong to the Plant, is evident from the common Effects of grafting Trees in Gardening. There is an Inſtance of Mr. DU HAMEL'S, in the Memoirs of the FRENCH Academy, which proves this abundantly, and in a very particular Manner. A young Citron of the Bigneſs of a Pea, was let in by the Stalk to a Branch of an Orange Tree. The Citron grew to its full Bigneſs, and became perfectly ripe, it but was to all Intents and Purpoſes a Citron; having nothing of the Orange at all in its Nature, Form, Taſte, or Appearance.

Now if the Nouriſhment received by the Orange Tree could be thus prepared in the Veſſels of the Citron Stalk, and Fruit, what Reaſon can there be to doubt, but that the ſame Nouriſhment taken up from the Earth, may be wrought in every Plant into the Colours, Qualities and Forms that are peculiar to that Plant.

Many contend not only that there is a particular Juice taken out of the Earth by each Plant for its Nouriſhment, but that every Plant has more Kinds than one. The Pulp of a Peach, the Stone, and the Kernel, they obſerve are very different Things, and they ſay there ought to be three different Juices taken up out of the Earth to nouriſh them.

This is betraying their Cauſe by ſaying too much. Doubtleſs the Organs and Veſſels of Plants give the different Taſte and Smell to the Sap, as well as occaſion its various other Effects in the different Parts. We do not find in the Earth the Taſte either of the Pulp, of the Peach, or of its Kernel. There are Soils that communicate a peculiar Taſte to the Fruits that grow upon them, but then this Taſte is given equally to all Fruits, and is perfectly different from their own, which each has beſide. In this Caſe the Earth has a Taſte, which it communicates univerſally; but the ſame Effect is produced beſide in the Veſſels of the ſeveral Trees, and Plants, as in other Places.

In the moſt ſtrict and accurate Examination of the Roots of Plants, we find no Preparation for receiving particular Juices. GREW ſhews that the Surface of Roots is a ſpungy Subſtance, which muſt receive all Juices alike; and the Surfaces of all Roots are ſuch. Theſe ſpungy Openings receive the fine Particles of Earth for Nouriſhment, and the Organs of the Plant give them their Differences in the different Kinds, as well as in the various Parts of the ſame.

Plants of the moſt different Kinds may be raiſed in Water, and they will all have their particular Forms, Taſtes, and Colours. Will theſe People ſay that there are in Water different Juices to be taken up by different Plants? that were abſurd. We ſay there are Particles of Earth in all Water, which is a known Fact: and that theſe are taken up by the Roots of Plants for their Nouriſhment: that they are in themſelves perfectly alike, and are taken up indifferently by all, but that they are changed in the Organs of the Plants, in order to give them their Forms, Taſtes, and Colours: this ſurely is reaſonable.

The Advocates for particular Juices affirm farther, that as there is a Neceſſity for a diſtinct Juice for nouriſhing each ſeveral Part of the ſame Plant: it cannot be but that the Roots of every Plant are ſo formed, that they will receive or admit no Juices but ſuch as are ſo appropriated to that Plant; and that the ſeveral Parts of the Plant afterwards appropriate again ſuch Juice as is alone ſuitable to them.

No Doubt but according to the Syſtem of different Juices, this ought to be the Caſe; the Queſtion muſt remain whether it is: and on the Deciſion of that, the whole Objection may reaſonably be ſaid to ſtand or fall. Mr. TULL has produced an Experiment on this Occaſion, the Reſult of which, as he relates it, is altogether deciſive; and deſtroys that Opinion entirely. The Experiment is this. Set a Stalk of Mint in a Glaſs of Water: it will grow there and ſhoot out many Roots. Let ſome of theſe Roots be got out of the freſh Water, and plunged into a Glaſs of Salt Water: in this Caſe the Mint will preſently die, and its Leaves will taſte ſalt.

In this Caſe there is no Doubt but the Mint is killed by the Effect of the Salt Water upon its Roots; becauſe if the ſame Roots had been cut off, the Plant would not at all have ſuffered: and the ſalt Taſte of the decayed Leaves ſhews plainly, that the Salt was the Cauſe of its Deſtruction. This Fact reſts upon the Credit of Mr. TULL, who has related it: and he aſſerts from it very fairly, that it is a Proof that Roots take in indifferently any Nouriſhment that comes in their Way, even when it is of a Kind that will deſtroy the particular Plant they are to feed.

CHAP. IX.

Reaſons deduced from the Practice of Huſbandry.

THE Practice of the Huſbandman, and its Succeſs, 'tis ſaid, prove that there are different Juices taken up out of the Earth for the Nouriſhment of different Plants. Why, ſay they, are Barley or Oats ſown after Wheat, and not Wheat again, if it were not that the Wheat has drawn all the nouriſhing Juice fit for its Kind, ſo that the next Crop of the ſame Species would be ſtarved; whereas there ſtill remains in the ſame Ground, the nutritive Juice fitted for Barley, and that for Oats, which therefore flouriſh, though a ſecond Crop of Wheat would not.

It has been anſwered already, that the real Cauſe of this is, that Wheat requires and takes up a large Quantity of Nouriſhment, ſo that there does not remain a ſufficient Stock for a new Crop of it; but that the ſame Land will raiſe Oats and Barley becauſe they require leſs: but to this we ſhall add here, that if it were true that the Cauſe of Barley growing well after Wheat, were that the Wheat had left in the Ground the Nouriſhment proper for Barley; then in Conſequence a good Crop of Wheat might be expected after Barley, becauſe the Barley would have left in the ſame Manner the Juices proper for Wheat, and the Ground would be, in this Reſpect, the ſame as if nothing had been ſown in it before. But this does not anſwer in Practice, and we may therefore be ſure the Theory is not true. Such a ſowing of Wheat would yield a very bad Harveſt. The Truth is this, Wheat does not ſucceed well except the Land have had four Workings: if Barley were ſown in Land ſo prepared, it would ſucceed greatly, but as it does not bear the Price of Wheat, nor require ſo much Preparation, they ſow it after two.

Barley will grow upon Land that has been impoveriſhed in ſome Degree by another Grain, therefore it ſucceeds after Wheat; but Wheat will not thrive unleſs it have the Land freſh, and thoroughly prepared to give it Nouriſhment, and it is therefore Wheat will not do after Barley.

If it were true that every Plant drew from the Earth a particular and appropriated Juice for its Nouriſhment, and no other; what Occaſion could there be for that antient Practice of letting the Lands lie fallow one Year in three, as is the Cuſtom in common Fields. If that were the Caſe, they might inſtead of this Time of Reſt, only give a Change of Crop. Thus if they ſowed Wheat the firſt Year, Barley the next, and Oats the third, and then Peaſe and Turnips; they might after this laſt Growth ſow Wheat again, the Land having had five Years to recover the Nouriſhment of Wheat: but this is not found in Fact, nor is there any Truth in the Argument that would ſupport it. The Nouriſhment of all theſe Plants is the ſame, and is no other than Earth in very ſmall Particles, and there is no other Difference between them, but that one Kind draws more of it than another.

Every one the leaſt acquainted with the Practice of Huſbandry knows, that in ſuch a Courſe as here deſcribed, all the Crops would grow worſe and worſe, till they would not be worth gathering: and this, becauſe all Crops exhauſt the Earth of the general Nouriſhment of Plants, though in a different Degree.

Beſide this the Reſt is not all that Land has during the Intervals of Crops for its Recruit. It is in this Time turned and worked, by which Means the Particles are anew divided, and there is a freſh Supply of ſmall ones procur'd for the affording Nouriſhment to the following Growths. The Texture of the Mould is broken ſo, that it gives free Paſſage again to the Roots of Corn in new Places; and by all this it is render'd proper for the Production of ſuch Plants as require a great deal of Culture, ſuch as Wheat particularly: and during the whole Time of this Reſt and Preparation, it is not ſuffer'd to be exhauſted by uſeleſs Plants.

If it were true that every Plant drew from the Earth a particular Juice for its Nouriſhment, which ſuited its Purpoſe, and that of no other Kind, then Thiſtles, Bluebottles, Corn Marygold, and the other Weeds ſo frequent among Corn, would do it no Harm; becauſe they would take only ſuch Juices as the Corn would not: but juſt the contrary is found in Fact. All theſe Plants do injure the Growth of Corn, and that, becauſe they all exhauſt the Earth of its Nouriſhment, which is the ſame for one and for the other.

If other Plants did not draw from the Earth the ſame Nouriſhment with Corn, then Corn might as well grow among the largeſt Cluſters of them, as ſingly in a Field: but we find it will not: and 'tis not to be pretended the Stalks of the Plant prevent this any Way, becauſe ſo many Sticks of dry Wood will do no Harm.

CHAP. X.

The Reſult of Experiments in Vegetation.

MANY have thought that every Thing that can be diſſolved in Water, enters indifferently into Plants; and that each ſeparate Kind, of all theſe Things, appropriates only what properly belongs to its Nature, and lets the reſt all paſs off by Tranſpiration.

This, like many other of theſe Reaſonings, has a very fair Appearance, but it cannot ſtand before Experiments. We can collect what paſſes off from Plants by Tranſpiration: Dr. Hales has done it, and the Reſult has altogether contradicted this Syſtem. Seeing what great Quantity of Matter perſpir'd, ſays he, I was deſirous to try if I could get any of it. I fix'd Glaſs Retorts to Trees of different Kinds, taking in their Boughs with the Leaves on into the Retort, and ſtopping up the Mouth about them. By this Means, ſays he, I got ſeveral Ounces of the Matter perſpir'd by Vines, Fig Trees, Apple Trees, Cherry Trees, Apricot and Peach Trees, alſo by Rue, Horſe-

radiſh, Rheubarb; and by Parſnips, and Cabbage Leaves. The Liquor of all of them was very clear, nor could I diſcover any different Taſte in the ſeveral Kinds: and the ſpecifick Gravity was very nearly the ſame with that of common Water. Here was a great Variety of Plants and Trees try'd, and if there were different Matters to be tranſpir'd, theſe certainly muſt have ſhewn that Difference, but upon this fair Experiment there appear'd no ſuch Thing, the Liquor obtain'd from them was in all Reſpects the ſame, it was perfectly like common Water, and ſhew'd no other Difference from it, than that it would ſtink ſooner: this ſhew'd that it took ſomething from the Plants, but the ſame from all. Having paſs'd through their Veſſels it acquir'd ſome vegetable Quality, but that was the ſame from any Plant. This Experiment is the ſeventeenth in Dr. Hales's vegetable Staticks, it is eaſily repeated; but the Authority of that Writer is ſufficient to eſtabliſh it; and it overthrows perfectly that Syſtem of the Plants taking up ſeveral Kinds of Juices, and letting all but the right tranſpire.

If this were the Caſe, that each Plant took up all that could be diſſolved in Water, and tranſpired what it did not want, the Ground would be continually exhauſted. For what was thus tranſpired would float in the Air, and be at the Mercy of the Winds, to carry which ever Way they chanc'd to blow.

Thus eaſily are theſe Objections to the Earth itſelf being the Matter of Nouriſhment to all Plants, anſwer'd; but there remains a farther Obſervation to be ſtated: as this will fall within the Farmer's immediate Notice, and is of much greater ſeeming Force than any of the former, it ought to be propoſed fairly in this Place, where we are enquiring after Truth for the Service of that uſeful Art.

The Huſbandman will obſerve, that when his Land which would no longer bear Corn well, has, for ſome Years, bore Saintfoin or Lucerne, it will again bear great Crops of Wheat. This ſeems to ſhew, that the Subſtance neceſſary for nouriſhing Wheat, and that neceſſary for nouriſhing of theſe Graſſes is different; and conſequently that the Food of all Plants is not the ſame. And in farther Support of this Argument it may be obſerved, that Grounds which are laid fallow, to give them Strength for Corn, bear in that State great Quantities of Weeds. This ſhould ſeem alſo to ſhew, that different Juices in the Ground are fit for the Nouriſhment of different Plants; and that it is not the Subſtance of the Earth which ſerves for all. This is what theſe Obſervations ſeem to ſhew; but let not the induſtrious Enquirer ſtop at Appearances, but proceed to a deeper and a fairer Search.

In purſuing this Subject we find, that thoſe Lands which are only left fallow, and have nothing done to them, do not improve either ſo quickly or ſo perfectly as they would have done, if they had been well wrought and tilled during that Interval.

We find alſo, that the greater Part of thoſe Plants which grow upon fallow Lands, are Weeds of ſlight Roots which ſpread juſt under the Surface, and do not penetrate to any Depth; and conſequently, that when theſe Lands are wrought, and the lower Part of the Soil is turn'd up, this is Land which has lain in abſolute Repoſe. Now the contrary to this happens when Saintfoin and Lucerne are ſown, for they root very deep: but for that Reaſon they do little Prejudice to the Soil near the Surface; for it is found by Experience, that theſe deep-rooted Plants draw their Nouriſhment from a great Depth, and leave the ſuperficial Parts of the Earth unexhauſted.

Thus when we ſee the full Extent of this Objection to our Syſtem, it ceaſes to be any Objection at all. In the Caſe of Weeds on Fallows, they exhauſt the Surface only, and that Surface is turned downward in plowing; ſo that the Earth which is turned up for the Growth of the Corn, is not exhauſted by them. It has lain its Year in Repoſe, and is now fitted for the Nouriſhment of Corn, by turning and breaking. The Saintfoin and Lucern root very deep, and draw their Nouriſhment from the lower Part of the Land; ſo that a Field cover'd with theſe Graſſes, has the upper Part of its Soil in a State of Repoſe; and when that comes to be wrought and turn'd up, it is freſh and fit for the Nouriſhment of Corn, for Corn is the moſt ſuperficial of all Growths in its rooting. Thus the Caſe is not that Weeds and Saintfoin draw only a particular Nouriſhment, and that different from the Food of Corn, that makes Corn ſucceed after them; but it is that the firſt exhauſts the Surface of the Earth which is turn'd undermoſt in plowing, and the latter exhauſts the Earth at Depths whence it is never turned up for Corn; and all the Time of their Growth, that Part of the Soil in which the Corn afterwards is to grow, lies quiet, they not affecting it.

The Farmer finds by Experience, that Plants with tap Roots do not ſucceed upon Land where other Plants with the ſame Kind of Roots have been. Thus Trefoil or Lucern will not thrive after Saintfoin; whereas thoſe Plants which have ſpreading Roots, ſucceed upon the Lands that have born the deep-rooted ones excellently; 'tis plain therefore, that theſe deep-rooted Plants have exhauſted the Earth of its Nouriſhment at thoſe Depths, but not at the Surface. 'Tis extreamly probable therefore, from all Appearances, that the Nouriſhment, or Food of all Plants, is the ſame, and that it is nothing but Earth in ſmall Particles. We ſee that Plants of any Kind exhauſt this Nouriſhment, according to the Depth at which they root; and no otherwiſe. When this Nouriſhment is exhauſted, the Earth muſt be prepar'd in order to the giving more; and as it conſiſts only of ſmall Particles of Earth, any thing that breaks and divides the Land anſwers this Purpoſe. The Effects of the Air do this in fallowing; the Plow does it in turning and labouring, and the different Manures do it by fermenting the Soil. All theſe Things produce the ſame Effect, by ſeveral different Ways, and conſequently in different Degrees; but of this the Farmer may be ſure, whatever will break and divide the Particles of Earth, will make that Earth proper for the Support and Nouriſhment of Plants.

CHAP.

CHAP. XI.

Of changing of Crops.

HAVING thus explained to the practical Husbandman the Nature of the principal Parts of Plants, and of their Nourishment, he will easily understand the Reasons of all that shall be proposed to him for the Improvement of his Profession: and, where any thing at all out of the common beaten Road was to be proposed, this Explanation was needful.

We see plainly, by the preceeding Observations, that all Plants are nourished by the same Substance; that every Plant will exhaust the Earth of its Nourishment, which would be fit for others of the same Growth; and that a Piece of Land which was once fit for the nourishing and supporting a Crop of any Plant, will continue to support and nourish Crops of that Plant for ever, if it be properly tilled and managed.

This last is an Article of great Consequence, and perhaps little believed by the common practical Farmers, but it is equally true with the others. It is seen to be so by Reason, and may, at any Time, be proved by Experience. Let those who would deny it, first try.

From this we see that it is not necessary to change the Crop every Year, upon the same Land. This plainly makes way for a new Method of Husbandry, and for vast Improvements in that useful Art. It is on these Facts that the Horsehoeing System has its Foundation; and being built upon Truth it must remain for ever.

We do not deny that in following the common Practice of Husbandry, there is a great Advantage in the sowing successively different Species upon the same Land. We have shewn, however, that this is not owing to the commonly supposed Cause, that each exhausts the Earth only of its peculiar Nourishment, leaving the proper Juices for the others; and we shall now explain that Matter farther.

There are three Causes which may occasion this good Effect of changing of Crops, in the common Method of Husbandry; but all of them different from this supposed Cause in the different Nourishment. The first is the different Quantity of Nourishment that is requir'd for different Plants, as has been hinted generally before; a second is the different Constitution and Formation of Parts in each particular Plant, some being much more delicate than others; the third is the different Quantity of Tillage which each Kind of Crop requires should be bestowed upon the Ground. These are the real Causes why a second Crop upon the same Land, should be different from the first, and a third from the second, although the Nourishment of all be the same.

All Plants do not draw from the Earth the same Quantity of Nourishment; this is plain, for there are poor and light Lands which nourish Rye very well, though they would not yield a Crop of Wheat, nor even of Oats. On the other hand, there are Plants which are able to plunge their Roots into a hard Soil, into which others cannot penetrate. The Roots of Oats will penetrate a hard Land better than the Roots of Barley, and therefore Oats will grow with less Tillage than Barley. This is seen in Experience, for Oats succeed tolerably well in many Places, where the Soil is hard, with only one dressing: Whereas Lands that are much lighter and softer, require two Dressings, in order to produce a good Crop of Barley.

From this Observation we may conclude, that in following the common Practice of Husbandry, some other Corn should be sown for the next Crop after Wheat; because Wheat requiring several Dressings of the Land, in order to yield a good Crop; and requiring also to be sown in the Begining of Winter, or soon after Harvest, it would be impossible to give the Land those necessary Dressings for it, without which we know, from Experience, it will not succeed. Here is a plain Reason for the changing the Crop in the common Method of Husbandry, without having Recourse to that idle and false Cause of the different Nourishment requir'd for different Plants. For with Respect to Oats and Barley, as they are not to be sown till the following Spring, there is Time between the gathering the Wheat Harvest, and the Season of sowing them, to give the Land the one or two Dressings which they severally require; though it would be impossible, in the short Time between the reaping of Wheat, and the sowing it for the next Crop, to give the Land the four Dressings needful for that Corn.

The Years Fallow that is given to prepare for Wheat, gives perfect Opportunity for those four Dressings, and for all the Advantages which the Land receives from the Air and Rains, between one of them and the other.

If any one should take a Resolution of always raising Wheat upon the same Land, he must sow it only every other Year. The Year between must be a Year of Fallow, for the giving the Land its four Dressings; and in this Manner the same Land would for ever yield large Crops of Wheat, without ever sowing any other Corn.

Mr. Tull produces an Instance which sufficiently shews that Wheat will not, in any Condition, succeed upon Land that has not receiv'd its proper Number of Dressings. He says, That on sowing a Piece of excellent Land with Wheat, in the usual Way, it grew so thick and heavy that it lodg'd, and little Grain was got at Harvest: after this the Owner seeing the Richness of his Land, thought that it would bear Wheat any Way, and giving it only one Dressing, sowed Wheat again, expecting, that as the Growth would be now less strong, he should have a better Harvest; but he was disappointed, he hardly obtain'd from it the Quantity of his Seed Corn.

Wheat is found to succeed very well after Turnips; and People from this have fancied, that the Nourishment of Turnips was different from that of Wheat, and that they did not exhaust the Earth at all of what should serve that Corn; but he who has consider'd what we have already said of Wheat, will see this is owing to a very different Cause. The great Requisite for Wheats

ſucceeding is, that the Ground be very well dreſs'd by Tillage. The Turnips are ſown on Ground that has been very well wok'd; and it is dreſs'd over again as they are growing: therefore, when the Wheat comes to be ſown afterwards, it has a Land different from what it commonly is allow'd, but different in the right Manner, for it is more labour'd and dreſs'd than in the cuſtomary Way.

Farther it may be obſerv'd, that Turnips exhauſt Land very little, unleſs they be ſuffer'd to run to Seed. Nor is this all: we find that the Nouriſhment the Turnip does exhauſt, is little more than Water, ſo that leſs of the earthy Matter going into them, the more is left afterwards for the Wheat. This Fact may be prov'd by Experiment on the Roots themſelves. If a large Quantity of Turnips be mix'd with Wheat Flower, and made into Bread, when the Bread after baking comes to be weigh'd, there will be found very little more of it than if the ſame Quantity of Flour had been uſed without any Turnips.

From this it appears, that if Turnips are ſown upon a Land intended for Wheat, and eaten off before they run to Seed, the Land is only better prepar'd for that Corn by their Growth, not being in any conſiderable Degree exhauſted of its nouriſhing Particles; and at the ſame Time the Cattle eating theſe Turnips upon the Spot where they grow, their Dung and Urine add greatly to the Richneſs of the Ground.

When Saintfoine has grown upon a Piece of Ground, there muſt be proper Care in the introducing Wheat upon it. This Ground not having been dreſs'd or turn'd for nine or ten Years, while the Saintfoine was upon it, will not be ſufficiently broken by one or two Dreſſings, for the nouriſhing a good Crop of Wheat. One or two Dreſſings after this Graſs will prepare the Ground very well for Oats: but more are altogether neceſſary for the Succeſs of Wheat.

Upon theſe Principles we ſhall find, that although in the ordinary Way of Huſbandry, it is impoſſible to have Wheat every Year upon the ſame Piece of Ground, with any Degree of Succeſs; yet in the Method of Horſehoeing Huſbandry, it may be done. All that we have been here premiſing, is for the Explanation and Recommendation of that Practice of the Farmer; from the which, managed with Prudence, according to the Directions we ſhall lay down, he may, in moſt Caſes, make a much greater Advantage of his Land than in the common Methods. By this Practice a Crop of Wheat may be advantageouſly rais'd every Year upon the ſame Ground, and the Means upon which this will depend are, to give it more Dreſſings; in order to break and divide the Particles of the Earth more perfectly; to put the Plants in a Condition to ſpread their Roots in this prepar'd Earth in the moſt advantageous Manner, for the obtaining the Nouriſhment wherewith it abounds; to prevent Weeds from robbing the Crop of its Nouriſhment thus afforded by the Ground; and to be careful not to raiſe upon the Land more Plants than can be ſubſiſted well upon it. Theſe are the Principles on which the Practice known by the Name of Horſehoeing Huſbandry depends, and every one muſt ſee, that theſe are founded on Reaſon, and on what is ſeen in the Growth of Plants in every Way in which they are rais'd. This has the ſure Ground of Experience, and therefore cannot fail.

CHAP. XII.

Of the Diſtribution of the Nouriſhment of Plants in the Earth.

WE have ſhewn the great Advantage of a Year of Fallow is, that it gives Time for a ſufficient Number of Dreſſings, for the Deſtruction of Weeds, and preparing the Land for Corn. Theſe Dreſſings muſt be at proper Intervals, for otherwiſe they have not half their Effect. Between one Dreſſing and another, the Weeds that are plowed in ſhould have Time to rot, and the Earth new turned up to receive the Benefits of Sun and Rain. A ſecond Dreſſing coming immediately after the firſt, would only throw up the ſame Land again, undoing what the firſt had done in a great Meaſure.

From what has been ſaid on this Subject, the conſiderate Reader will underſtand not only the Neceſſity of Dreſſings for Land, but the Nature of their Benefit: and in purſuing this we ſhall naturally fall upon the Subject of the preſent Chapter, which is the Diſtribution of that Nouriſhment we have deſcribed in the Earth.

However good a Soil may be in its Nature, the Plants ſown in it can have very little Advantage from its Richneſs, if their Roots cannot ſpread and penetrate it to get at the Nouriſhment. A Soil that is too firm will not permit this, its Riches are as if they were lock'd up; and it muſt be broken by Dreſſings. The vaſt Fertility of Garden Ground is owing in a great Meaſure to this continual ſtirring and breaking of it in digging; and we ſee in the ſame Manner that all Earth is fruitful that is frequently mov'd and broken. We may therefore ſafely eſtabliſh it as a Principle, That the more the ſmall Particles of a Soil are divided, the more its inward Pores are multiplied, and it is in Proportion render'd the more fit for the Nouriſhment of Plants. We have ſaid already how great Things may be done for the Improvement of Land by Manures, we now come to the Article of Dreſſings, for on the proper Underſtanding of theſe two Things depends all the Knowledge of Huſbandry. The common Practice reſts moſt upon Manures; the Horſehoeing Huſbandry on Dreſſings of the Land by Labour and Tillage: this is their great Difference.

The Nouriſhment of Plants, we ſee by Experience, is ſpread throughout every Part of the Earth, but it would there anſwer no Purpoſe to us if Plants were not able to draw it, and take it in for their Supply. To this Purpoſe it is neceſſary, that they have the Means of ſpreading the ſmall Fibres of their Roots between the ſeveral little Particles of Earth in a Soil. Land in which theſe Particles are preſſed too cloſe, or convected too firmly together, pre-

vents this Paſſage of the Roots; but it appears altogether neceſſary that there be Spaces between theſe Particles into which thoſe Roots may run. Moſt Soils have naturally theſe inward Pores, but frequently they either are in too ſmall Quantity, or they are not of proper Kinds and Proportions for the admitting and ſupplying the Roots. This is the natural Defect of Soils, and this is to be remedied by Dreſſings.

When the Pores are in too ſmall Number, it frequently is found that there is no Communication between one of them and another; and by this Means the Roots are ſtop'd in their Paſſage, and cannot get at the Nouriſhment that is ready for them in other Places, nor obtain enough for the Support of the Plant. This is the Fault of too ſtiff Soils.

On the other hand when the Pores are too large, the Roots go through them almoſt without touching the Earth, they therefore can take no Nouriſhment from it: this is the Fault of too light Soils.

Theſe are the Defects of the Generality of Soils, and theſe may be remedied by Culture properly conducted: for the Earth contains ſo great a Quantity of Nouriſhment, that there is no Need to fear exhauſting it; the only Buſineſs is to put the Roots into a Condition of getting at it.

Neither are we to fear that this Nouriſhment, intended for Plants, will be ſcattered and loſt of itſelf: Experience ſhews that there is no ſuch Danger. If we dry a Piece of Earth ever ſo thoroughly, and then powder it ever ſo fine; if we expoſe it in this State ever ſo much or ſo long to the Sun, Rains, and Froſts, it will not have its nouriſhing Particles diſſipated or loſt by this; but all that Management will render it more and more fertile. This is a Proof that the Nouriſhment it affords is real Earth, Water is neceſſary to be mix'd with thoſe Particles of Earth, which are the Nouriſhment of Plants; and in the common Courſe of Things, when this has carry'd up the nouriſhing Particles into their Veſſels, it is tranſpir'd through their Leaves, leaving thoſe Particles behind. This is the Courſe of Nature in the ſupplying of Plants: but when Water is evaporated from the Earth, without paſſing with it into the Veſſels of Plants, it goes off alone, taking with it none of thoſe nouriſhing Particles. This is plain from what we have before obſerved, that Lands which are left fallow grow more rich and fertile; whereas, were the Water that is evaporated from them to carry the nouriſhing Particles of the Earth along with it, they would be rendered poorer by this Practice.

In the Management of Land for giving it Fertility, what we are to aim at, is not ſo much to provide or ſupply Plants with ſuch Particles as are needful for their Nouriſhment, as to diſpoſe them in ſuch Manner that the Plants can gather thoſe Particles they poſſeſs, with their Roots. Almoſt all Soils contain of themſelves the Nouriſhment of Plants in Abundance, what the Huſbandman is to do is, to put them into a State fit to afford it to their Wants.

The great Article in bringing this about, is a proper dividing and breaking of the Particles of the Earth; this muſt be done in ſuch a Manner, that thoſe Particles may leave between them as great a Number as poſſible of little Spaces, into which the Roots may inſinuate themſelves, in ſuch a Manner, that immediately touching the Particles of Earth, they may gather from them thoſe extreamly fine and minute Parts, which are their real and proper Nouriſhment or Food.

This breaking and dividing of the Soil is to be done, as already ſaid, two Ways, by Manures and by Tillage: we ſhall, in the ſucceeding Chapters, examine impartially and ſtrictly by which of thoſe Means it may be beſt obtain'd; for on that depends the Merit of one or the other Kind of Huſbandry; and it is by underſtanding their different Operations alone, that the practical Farmer can be directed in his Choice, which Method to prefer on any particular Occaſion; and how to manage his Ground to the greateſt Advantage. This it is the immediate Purpoſe of our Work to inform him; and we ſhall therefore give a fair and candid Repreſentation of every reaſonable Method that has been propos'd for this Purpoſe.

BOOK VI. PART II.

Of the Advantages of TILLAGE.

CHAP. XIII.

Of the ſeveral Methods of dividing the Particles of Earth.

WE have ſhewn, in the preceding Chapters, that the Means of giving Fertility to a Soil, conſiſts in the dividing and breaking of its Particles. We are now to examine in what Manner that Effect may be beſt produced; and we ſhall do this with Impartiality. The favouring a particular Syſtem may miſlead Men, but they are ſafe from Prejudice who have no Aim but the Diſcovery of Truth.

There is, beſide the two Ways already mentioned of dividing the Particles of Soil, which are Tillage and Manures, another to be remembered here, which is Heat, or the Effect of Fire. The Difference is this, Tillage operates mechanically, breaking thoſe Particles merely by the Inſtruments employ'd in it; Fire acts in the Way of Calcination; and Manures by Way of Fermentation.

Dung, which is the principal amongſt Manures, always alters in ſome Degree the Nature of the Productions; and there is beſide another Diſadvantage in this Reſpect, which is, that we cannot

procure it always in the needful Quantity. On the other hand, it is always in our Power to increaſe the Tillage as much as we pleaſe, and this never alters the Quality of the Productions; Dung and other Manures may give ſome Subſtance to the Earth; but repeated Dreſſings by Tillage expoſe one after another, the different Parts of the Ground to the Influences of the Sun, Air and Rains, and theſe render it in a ſurprizing Manner fit for the affording Nouriſhment to Plants.

It has been ſhewn already, that the more we break the Particles of the Earth, the more we increaſe the Number of its inward Pores; the more we increaſe the Surface of thoſe Particles, the more we put the Soil in a Condition to furniſh Plants with Nouriſhment: that is, the more we add to its Fertility.

We ſee it is in our Power to effect this by Fermentation raiſed by Means of Manures, or by the Inſtruments of Tillage; and that the Uſe of Dung is limited, becauſe the Quantity is limited; but the Method by Tillage is without Limitation, becauſe we may give as much as we pleaſe.

That Dung has the ill Effect of ſpoiling the Taſte of the Products of the Earth in ſome Degree, is proved by its Effect in Kitchen Gardens. The eatable Plants raiſed with Dung being much worſe taſted than thoſe without. The Cabbages and Pulſe are never ſo well flavoured in great Towns, where they are raiſed with Abundance of Dung, as they are in the Country where Dung is ſcarce, and leſs of it is uſed in rearing them. And in the Wine Countries this Effect is the moſt obvious of all, the Difference being ſurprizingly great between Wine made from the Produce of a Vine that has been dunged, and that from the Grapes of the ſame Kind where there has been none of that Manure uſed.

Theſe are the real and certain Diſadvantages of Dung, eſpecially when uſed in too great a Quantity: Mr. Tull has carried this Point much farther. He attempts to prove that Dung gives hurtful Qualities to the Plants raiſed by its Aſſiſtance: but the Fondneſs for his Syſtem carried him in this a little too far; and it muſt be obſerved, that his Arguments are not concluſive.

It is probable, on the contrary, that a poiſonous Plant would have leſs Power when raiſed in a rich dunged Soil, than in the pooreſt natural Earth; for we find Dung, though it increaſes the Growth of Plants, weakens their Qualities, and even their Taſtes.

Dung acting by Fermentation makes an inward Diviſion of the Particles of the Earth, which muſt needs be uſeful in giving it Fertility; but the Inſtruments of Tillage break thoſe Particles, and at the ſame Time do ſomething more; they change their Place, they turn about the larger Parts of the Soil, and give them all the Advantage of the Seaſons, at the ſame Time they deſtroy Weeds. The Improvement therefore which is made by Tillage has many Advantages, whereas that made by Dung has but one. The Earth thus dreſſed is not exhauſted by uſeleſs Plants; and it receives from Time to Time, and in all its Parts ſucceſſively, the Advantages of the Dews, Rains and Sun, all which we ſee, from manifold Experience, aſſiſt greatly in giving Fertility to Land.

A great Diſadvantage attending the Uſe of Dung is, that it draws Inſects together which eat the Produce. When Trees are planted in a dunged Ground, it is always found that their Roots ſuffer by Inſects; and the curious in Flowers have for the ſame Reaſon baniſhed the Uſe of this Manure from their Practice.

A very good Method to remedy this Evil, where Dung is found proper to be uſed, is to mix Lime with it in the making up the Heap. Let a Layer of quick Lime be firſt laid for a Foundation to the Heap of Dung, and then as the Dunghil riſes by the Addition of freſh Quantities, let there be here and there a Layer of Lime ſpread between. This will not only deſtroy thoſe miſchievous Inſects which the Dung frequently brings with it, but it will alſo kill in great Part thoſe Seeds of Weeds which are one Way or other received among the Dung, and produce them too often in Abundance among the Corn.

It is repreſented as a great Advantage of Dung, that it is equally uſeful on all Kinds of Soils, the light and the heavy: and there are very few Exceptions to this; but the ſame is to be ſaid in favour of Tillage: for it equally agrees with the ſtiff and the looſe Soils, and improves and gives Fertility to them all.

Stiff Soils have their Particles ſo cloſe to one another, that the Roots of Plants cannot make their Way, or penetrate them ſufficiently; and it is well known that when the Roots cannot penetrate and ſpread in the Earth, the Plant languiſhes. Now when theſe Lands have been broken and divided by Tillage, and their Particles thus ſeparated from one another, ſo that the Roots find Paſſage among them, and can ſpread as they ought to ſeek Nouriſhment, they will be able to ſupply the Plants with Food; and we ſhall ſee the Crop grow upon them with Strength and Vigour.

This is the Advantage of Tillage on ſtiff Soils; and it has an equal good Effect on ſuch as are too light and looſe, though in a contrary Way. The Fault of theſe light Soils is, that they have too large Spaces between their Particles, and that many of theſe have not a Communication with one another, ſo that the Roots paſſing through theſe large Cavities, do not reach their Sides; and, conſequently, not touching thoſe ſmall Particles of Earth which are the proper Nouriſhment of Plants, they cannot take them in, and of courſe cannot draw Nouriſhment for the Plant. Now the Effect of Tillage on theſe Soils is this; it breaks the Particles of Earth as in the other, and by that Means multiplies Spaces between the Particles, making a great many ſmall ones inſtead of a few large ones. This it is obvious to Reaſon muſt be the Effect of breaking and dividing a light Soil that has large Intervals; and this naturally qualifies it for affording Nouriſhment to Plants: for theſe ſmall Spaces have their Communications between one another, tho' the larger, from the Nature of the Soil, had not, ſo that the Roots of Plants can penetrate into them, and run thro'

them

them as they ſhould; and at the ſame Time touching their Sides every where becauſe of their Smallneſs, they are able to take in thoſe extreamly minute Parts of Earth which we have ſhewn to be the proper Nouriſhment of all Plants.

We have obſerved, that in order to the Roots of Plants receiving or drawing in their Nouriſhment, there muſt neceſſarily be a kind of Preſſure or Reſiſtance between thoſe Roots and the ſmall Particles of Earth among which they run. This naturally happens when the Spaces between thoſe Particles are ſmall, though it could not when they were ſo large as they naturally are in light Soils.

CHAP. XIV.

Of the Degrees of Tillage, and of the Uſe of Dung.

WE have obſerved in a former Chapter, ſpeaking of Dung, that Mr. Tull has endeavoured to prove it uſeleſs on all Occaſions, as well as hurtful on many; and that he is for baniſhing it from the Practice of Huſbandry.

We there obſerved, that the Fondneſs for his Syſtem carried him too far on this Article, and we ſhall here ſhew that he was not ſo far cenſured without Reaſon.

The Origin of the Horſehoeing Huſbandry we have obſerved, is laid in that Paſſage recorded by Mr. Evelyn, where it is aſſerted that nothing more is neceſſary than the thoroughly breaking and dividing the Particles of Earth, in order to make it capable of nouriſhing any Plant: from which it appears that nothing more is uſeful to the giving Fertility to a Soil, than the dividing of its Parts, and breaking the little Lumps into which they form themſelves. This is very true with Reſpect to many Kinds of Soil, but it will not hold good of all: and from this we ſhall ſhew the practical Huſbandman, that there is Danger in his adhering to any Syſtem or Method too ſtrictly; for that although the Benefit of Tillage, in the Manner it is propoſed in the Horſehoeing Huſbandry, may be, and certainly is greater than that of Dung on many Soils, it is not on all. The judicious Farmer in order to make the moſt of every Part of his Land, ſhould be acquainted with every uſeful Method of managing it; but when he knows them all, he ſhould prefer that Kind to each Part which is ſuited to its Nature. 'Tis the informing him in this particular Manner, that is the Intent of the preſent Work: we have laid before him the old Method by Manures, we are here about to propoſe to him the new Huſbandry, which places a particular Kind of Tillage in their Stead; and that he may be able to employ that Knowledge, we ſhall endeavour to convey to him on this Head to the beſt Purpoſe; we ſhall ſhew him, that neither is abſolutely preferable to the other, ſo as to render it entirely uſeleſs; but that one Kind of Management may do for one Land, and another for another: we ſhall ſhew him where Manures will be preferable to the breaking of the Ground by this Method of Tillage, and where this Tillage may be preferable to the common Way by Manures; and ſhall give him ſome Directions alſo with Reſpect to this Tillage; as we already have regarding Manures: ſhewing in what Degree the one, as in what Quantity the other, may be uſeful and neceſſary to particular and different Soils.

Mr. Evelyn has ſaid, that the breaking and dividing a Quantity of Earth, and expoſing it for a Time to the Weather, will render it ſo fertile, that it will ſupport any Plant. On this reſts the Foundation of Horſehoeing Huſbandry, which propoſes to render a Soil fertile by breaking and dividing it with Tillage. But Mr. Du Hamel declares, that the Fact is not univerſally true, and therefore diſputes the Practice founded on it in ſome Points, while he allows it its Merit in others. He ſays the Aſſertion is not true of all Kinds of Earth, for that he tried it on Clay, and found it did not ſucceed. He powdered a Quantity of Clay, and ſifted it thro' a fine Sieve; but after this, wetting it with Water, it became as tough and ſtiff as it had been originally. This is the Objection ſtated by Mr. Du Hamel, and though not ſo concluſive as he ſeems to intend it ſhould be imagined, it has its Weight.

In the firſt Place, he has not on this Foundation a Right to queſtion Mr. Evelyn's Fact, for he did not fairly try the Experiment. He ſays he powdered and ſifted the Clay, but he does not tell us he expoſed it to the Weather. This is a Part of Mr. Evelyn's Proceſs, and he ſays it ſhould be ſo expoſed a Year. We have ſeen in the preceeding Part of this Work, that the Effect of Fire in a proper Degree of Calcination, renders Clay fertile. We have obſerved alſo on other Occaſions, that the Sun and Air have in theſe Reſpects the Effect of Fire, only that it is brought about more gradually. Now in this Caſe the powdering of the Clay would have rendered it more fit to receive the Influences of the Sun and Air, and the continual ſtirring and turning of it, which is directed in the Proceſs, would have expoſed every Part of it at Times to their Effect; ſo that it is not eaſy to ſay how much the Proceſs fairly tried would have done toward the rendering even Clay fertile.

However, although the Experiment be ſtated imperfectly, and does not infer ſo much as Mr. Du Hamel intends; yet this may be properly ſeen from it, that clayey Soils will not be ſo readily improved by this Tillage as the loamy and lighter Kinds; and that other Methods may be needful to be practiſed upon them. Thus the Tillage of the Horſehoeing Huſbandry alone, will be ſufficient for light loamy Soils; and on the other hand, the Farmer who has ſuch as are ſtiff and clayey, will do well to call in to its Aſſiſtance the Effects of Sand, and the other proper Manures; and when that appears neceſſary, of Calcination.

It is in this prudent and moderate Way we ſhall recommend the Horſehoeing Huſbandry to the practical Farmer: and it is thus, and thus only, he ſhould admit the Uſe of any new Methods. Their Authors or Inventors are always partial

partial in their Favour; but that may be very beneficial on many Occaſions, which is not adapted to all.

It is certain that clayey Soils are apt to grow ſtiff again, after ever ſo much Tillage; as has been obſerved in its Place, unleſs aſſiſted by proper Manures; yet we are not for that Reaſon to ſay, that for clayey Soils, Manures are better than much Tillage, for none require ſo much as theſe. Both are required for theſe Lands: a great deal of Tillage to break them, and then good and proper Additions to keep them in Order. 'Tis thus that from very indifferent they become ſome of the beſt Soils we have; and it is thus the Farmer is to manage them. Here therefore neither the old Huſbandry is better than the new, nor the new better than the old, but the true Practice is to join them.

Manures are neceſſary to Clays to keep them in a good Condition, after they have been divided by the Tillage; and they are neceſſary to light Soils becauſe they want Matter of Nouriſhment. They enrich theſe and divide the other: they are neceſſary to both, and they will take double Effect on both, when they are accompanied with good Dreſſings.

CHAP. XV.

Of the joint Advantages of Manure and Tillage.

THESE are the Advantages of Manures, the World has been ſenſible of them at all Times, and it is the Farmer's Intereſt always to continue the Uſe of them, not to neglect them for any other Practice: but this does not make the Horſehoeing Huſbandry, which was meant to ſet them aſide, at all the leſs uſeful. Where Manures cannot be had in due Quantity, this Tillage will, on moſt Soils, ſupply the Place of them; and where they are ever ſo plentiful, it will be a Means of giving them much greater Effect. The Uſe of Manures need not make the Farmer leſs regard his Tillage; for the more the Ground is broken and divided by that Means, the more Effect they will take.

Wheat that is the ſtrongeſt Corn, and requires the moſt Tillage of the Land, ſucceeds yet better when even more is given than uſual; and it is found by Experience, that this may ſupply the Place of Manure. Four Dreſſings are commonly given Land for this Corn, and the Uſe of Dung is added: if the Farmer will give it eight Dreſſings inſtead of four, it will ſucceed as well in moſt Soils without Dung. Theſe additional Dreſſings coſt much leſs than Manures, and when they ſucceed, the Effect is equal. They will at any Time in part, and on many Occaſions entirely ſerve inſtead of Manure, therefore it will be certainly to the Intereſt of the Farmer to uſe them.

Upon theſe Principles it is eaſy to ſee, that there may be Improvements made in the common Practice of Huſbandry. Tillage in the common Way does not anſwer the Farmer's Purpoſe for ſtiff clayey Soils. It breaks the Soil in this Caſe only into a Kind of large Lumps, which have large and irregular Cavities between them; and we have ſhewn from the Nature of Plants, and their Manner of obtaining Nouriſhment, that ſuch a Soil is not in a Condition to ſupport them well. From this it appears, that for the Farmer to uſe theſe Lands to the beſt Advantage, he ought to give them more than the common Tillage; and that by the repeated Dreſſings in the Horſehoeing Huſbandry, he is to break thoſe larger into ſmaller Lumps. By this Means a ſtiff Soil will be brought into the Condition of a light one; and will be perfectly fitted for the Nouriſhment of Plants, or the raiſing a good Crop: Manures are at that Time to be added, and they will be received into the Body of the Soil better than they otherwiſe could; and there will then require nothing more than a Repetition of that Practice which brought the Land into this good Condition, to maintain it in the ſame for ever.

We have ſhewn that Sand is a good Manure for Clay: this proves the Advantage of Tillage on ſuch Lands, for Sand anſwers the ſame Purpoſe in a Manner with Tillage. It breaks the Soil, and lets in the Sun and Rains, and gives Paſſage to the Roots of the Crop. This is juſt what Tillage does, it furniſhes no nouriſhing Matter to the Soil, it only ſeperates the Particles of the Earth; or keeps them ſeperate when they have been broken by Tillage, and this produces all the good Effects we deſire.

Light Soils are improved by Dreſſings, but they need not to be ſo frequent as on the others. To theſe Manures are wanted to give Richneſs, as to the others, to divide and keep the Soil divided: but we need not be afraid of exhauſting the Fertility of theſe Lands, by expoſing them to the Sun: this has been anſwered already, for the Sun evaporates only their watery Parts, not that ſolid Subſtance which is to be the Nouriſhment of Plants. It is certain that all theſe Lands are improved by Dreſſings, and thoſe not in ſmall Number; whether it be that this happens from the breaking of their Particles, makeing them more ready and fit to receive the Dews and Rains, and to receive the Influence of the Sun and Air, or whether from the multiplying their inward Cavities, as Mr. Tull imagines, ſo that they are fitter for the ſpreading of Roots; from which ever Cauſe it riſes, the Effect is certain: and one great good farther attending it is, that by theſe repeated Turnings, Weeds are deſtroyed entirely; whereas light Soils are thoſe which in the common Methods of Huſbandry produce them moſt of all, and that in greater Abundance, from the Uſe of Dung and other rich Manures.

What is here ſaid of the Advantage of turning light Soils, and breaking them by repeated Dreſſings, may be proved by way of Experiment. Let one half of a Piece of Land that has this Soil, be dreſſed in the common Way, and the other be perfectly broken and divided by the Method of Tillage uſed in the Horſehoeing Huſbandry: after ſome Time let the whole Field be turned again in a dry Seaſon, and that croſsways, ſo that the Land may be cut exactly in the oppoſite Direction to what it was

at firſt: in this Caſe we ſhall perceive by the Eye the Advantage of this thorough Manner of Dreſſing, for that half of the Field which had been perfectly tilled before, will have quite a different Aſpect, from that which was but careleſly gone over in the uſual Way: and we ſhall ſee plainly, that the one has had the proper Advantage of Dreſſings, and the others not. We may find the ſame Proof at any Time in the Difference of the Crops on ſuch light Land as has been well laboured, and ſuch as has not, but here it is obvious even to the Eye.

Many have a Cuſtom of breaking the Particles of a Soil with Rollers. This does not deſerve the Name of breaking in Compariſon of what is done in the proper Way by Tillage, but it has its Advantage. When the Land is not too moiſt, it is a very good Method of preparing it for Tilling; but in wet or very damp Lands, the Rollers does more harm than good. Some alſo ſuppoſe that they can ſupply the Place of the proper Tillage by frequent harrowing of their Lands after they are ſowed; but this ſcratching of the Surface of the Ground at beſt can do little Good; and when the Ground is wet it will do a great deal of Harm.

CHAP. XVI.

Of the Preparation of Wood Lands for Corn.

WHEN a Piece of Ground has not been ſown for a great many Years, and is to be prepared for Corn, they call it a new Land: this requires a particular Manner of Dreſſing, and that is to be varied according to the Condition in which they have been before, ſome being heathy, others having lain in Wood, ſome in Paſture, and others in artificial Graſſes. Theſe require ſeverally their particular Methods of Dreſſing; and there are others whoſe natural Humidity makes them demand a Method different from all. Theſe laſt we have conſidered before: we ſhall treat of the others ſeparately, and begin with the Method of preparing a Piece of Land for Corn, that has been covered with Wood.

In the Beginnings of Agriculture, thoſe who ſet about it had much more of this Buſineſs upon their Hands, than we at preſent; a very natural Condition of an uncultivated Country, is to be over run with Wood; and in ſuch a Caſe many found whole Countries who firſt ſet about their Improvement. In this Caſe it was not worth while to fell the Timber, for they would have had no Market for it; ſo they ſet Fire to it upon the Spot, and the Aſhes, aſſiſted by the Action of the Heat, were of great Service in the Improvement of the Ground: after this they had no more to do than to ſtub up, make all level, and go to ſowing.

At preſent Wood is ſo valuable, that it is to be treated in another Manner. When a Piece of this Land is to be turned into a Corn Field, the Trees are felled, the Roots are ſtubbed up, and this is ſuch an Advantage to the Land, that it will anſwer in ſome Degree the Effect of the burning, and of the Aſhes in the other Inſtance: and a little Trouble does afterwards.

We have ſaid in a preceeding Part of this Work, treating of Coppice Wood, that it is a very good Preparation of Land for Corn. It may be often worth while to plant Coppices with this very Intent: but whether that be done, or the Coppice or larger Wood be felled for this Purpoſe, there is no Land that anſwers more happily for Corn, or with leſs Trouble.

The Holes that are made in taking up the Roots, and the reſt of the neceſſary digging, turn up and break the Land in an excellent Manner, ſo that half the Labour of Dreſſing is ſaved.

In this Caſe, after the Earth has been levelled, there is no Occaſion for more Tillage than this, it is to be turned up once in Autumn with the Plow, the Froſts of the ſucceeding Winter kill the Weeds, and break the Particles of the Soil; and after this no more is needful than a ſecond Dreſſing of the Ground in Spring, and the Land may be ſown, and will yield a vaſt Produce.

This Land that has lain in Wood is not only very fertile at firſt, but it continues ſo a long Time. The Trees have drawn their Nouriſhment from great Depths, ſo that the upper Part of the Ground has lain in a Manner unexhauſted, and the Shade of the Boughs has prevented Weeds from growing in any great Quantity. Beſide this, the Leaves falling every Year, and lying upon the Earth till they rotted, have been for many Years a continual Manure of the richeſt Kind upon the Ground; and the decayed Branches have added to the Fertility, for the ſame Reaſon.

Thus we are to look upon a Piece of Land that has been ſome Years in Wood, as if it had been in a Manner laid fallow all that Time; and the Conſequence proves, that we are not diſappointed in the Expectation from it. A good Piece of Land that has been ſome Time in Wood, will produce vaſt Crops of Corn for many Years, without the Aſſiſtance of the leaſt Article of Manure; dreſſing it but moderately by the Tillage of the Horſehoeing Huſbandry; and that which was originally of little or no Value, and would not have produced Corn to any Advantage, with the moſt expenſive Manures, when it has lain ſome Years in Wood, anſwers beyond Expectation. There are Trees of one Kind or other that will grow on all Kinds of Ground; and there is a certain and very great Advantage from them: this has been ſhewn already. We ſee the Conſequences of that Growth in the Improvement of the Soil, and this conſider'd together, may be ſufficient to lead many who have Lands which they know not how to bring to any Value, to try them this Way. While we recommend this Method, we illuſtrate by the Example, the Practice of Horſehoeing Huſbandry, and ſhew the Truth of thoſe Principles on which we have before ſaid it is founded. We have ſaid that the Roots of Plants ſeek their Nouriſhment near the Surface; and that Trees penetrate for it deeper: this is proved by the Readineſs of a Soil on which Trees have long grown, to yield great Crops of Corn: and we ſee in the Practice by which it is prepared

for this Growth, the great and certain Advantage there is in breaking and dividing the Ground: for all that ſtubbing and digging that is needful in taking up the Roots, ſerves in the Place of ſo much Manure to the Land. The Spade and Pick-axe break the Lumps and divide the Soil, juſt as well as the common Inſtruments recommended in the new Huſbandry; and the Effect is the ſame; for the Land is made fit for the bearing of Corn. Let the Particles be broke and divided, and the Purpoſe is always anſwer'd: it is no Matter by what Means that is done; ſo it be done the Effect is certain.

CHAP. XVII.

Of the Preparation of heathy Land for Corn.

UNDER the Denomination of heathy Land, we here mean every kind of waſte and uſeleſs Ground, that produces Weeds of the worſt Sorts, and is very barren of what is good; ſuch as Tracts of Ground over-run with Heath, Broom, Brambles, Fern, and the like: theſe are the Lands of which we treat in this Chapter, with reſpect to the preparing them for bearing Corn.

It is always proper to burn theſe uſeleſs Productions upon the Spot, as we have ſhewn already under the Article of Burnbaiting. This is ſerviceable, not only becauſe the Heat improves the Ground by a Kind of Calcination, and the Cinders ſerve as a Sort of Manure, but the immediate Effect of the Fire upon the Roots, is a great Benefit, nothing ſo perfectly deſtroying them; nor any other Practice ſo thoroughly ridding the Ground of the Fear of their after-ſhooting. As the Seeds are conſumed, as well as the Roots perfectly deſtroyed, by this Practice, there is great Reaſon to believe they will never riſe again, and this is of the utmoſt Concern, becauſe they are dreadful Enemies to all uſeful Growths.

We have, in another Place, cautioned the Farmer to take Care, that in burning his Stubble upon the Land, he does not fire his Hedges; but a greater Caution is needful here. In firing the Growth of theſe waſte Commons, the Quantity is ſo great, that it is a Body of Flame capable of ſpreading to do vaſt Miſchief. The firſt Care therefore muſt be to know, before the Fire is lighted, where it will ſtop, for it may ſpread much farther than ever was intended or thought of.

When a heathy Piece of Ground is to be thus fir'd, the beſt Method is to clear away a good Space where it is intended to ſtop, by cutting up the Furze and the like; and this will ſtay the Progreſs, though nothing elſe can. At the ſame Time the Stuff that is cut up, being dried, will ſerve to begin the Fire, ſpreading it at the other End of the Ground.

A tolerably calm Seaſon ſhould be choſen for ſetting about this, and the Fire watch'd as it burns. If it any where at the Sides threatens to exceed its Limits, the Method is to dig inſtantly a little Ditch, throwing the Earth upon the Fire. This will preſerve the reſt; for Earth is a much more ſudden and certain Quencher of Fire than Water.

When the Stuff is thus burn'd, the Roots of the Furze and Heath are to be dug up with a Pick-axe, and ſuch others as are firm enough to ſtop or impede the Plow. The Land is then fit for the common Practices of Huſbandry.

The beſt Seaſon for burning the Buſhes is Autumn, and as ſoon as ſome Rains have fallen, the Ground is to be turn'd up in large Furrows, by a ſtout Plow, it is then to lie till Spring; and then, after another plowing, it ſhould be ſown with Oats; the ſecond Year it is to have three good Dreſſings, turning, cutting, and breaking it well every Time; and the third it will be in a Condition to bear Wheat, without any Addition of Manure.

The ſingle Article of Labour, after the firſt Aſſiſtance of burning, does the whole Buſineſs; but this Labour muſt be well perform'd, and ſufficiently repeated; for as the Fertility, in this Caſe, depends principally on the breaking the Lumps, they muſt be well broken, and nothing but this thorough Tillage can prevent the old Inhabitants from taking Poſſeſſion again of the Ground. Notwithſtanding they have ſeem'd ſo perfectly deſtroy'd, they will, after ſeveral Years, recover, to the Deſtruction of all uſeful Growths, if they be not kept down by this Tillage: but this, if properly attended to, will never fail. The Winter turning expoſes the Roots to the Froſt, which nips them, and the Summer turnings ſpread them before the Sun, that burns them up. In general, it is one vaſt Advantage of this Kind of Huſbandry, that no other whatſoever ſo perfectly deſtroys Weeds of all Sorts, and that in all Lands; the annual as well as perennial: thoſe that riſe in Numbers from every Years Seeds, and thoſe that remain from Year to Year by their Roots.

CHAP. XVIII.

Of the Preparation of Land for Corn, after the artificial Graſſes.

WE have obſerved that it may be often proper to prepare an indifferent Land for Corn, by planting it with Coppice Wood: the ſame Advantage that it receives from this Plantation, it may alſo have from the artificial Graſſes that root deep; and from none ſo much as Saintfoin, which penetrates very far into the Ground, and draws very little of its Nouriſhment from near the Surface. We have obſerved that the planting a Piece of Ground with Coppice, is a Kind of fallowing of the Land, with reſpect to the upper Part, or that which is concern'd in the feeding of Corn; and the ſame is the Caſe with theſe deep-rooted Plants.

Many have been ſurpris'd to ſee theſe, and the Saintfoin in particular, grow ſucceſsfully upon theſe ſtony Grounds, which have but a very thin Coat of Soil; but this is no Argument againſt its rooting deep, and thence drawing its Nouriſhment: on the contrary, this Inſtance, when well underſtood, is the greateſt Proof that can be brought

brought of the Truth that this Graſs draws its Nouriſhment deep, and that it does not exhauſt the Land near the Surface, which is the Seat of Nouriſhment for Corn.

When there is this ſtony Bottom to a thin Soil, it is uſually looſe, ſlaty, or crack'd toward the upper Part, or where it riſes to the Bottom of the Mould: and theſe Cracks and Openings are found, on Examination, to contain Mould of the ſame Kind with that above. The Saintfoin that is ſown in this Soil, ſends its Roots into theſe Cracks and Crevices, and runs among them to a great Depth. From the Earth that is lodg'd in theſe it obtains its Nouriſhment, and ſcarce draws any from the thin Coat of pure Ground above.

Theſe Sorts of Land, when kept conſtantly in Tillage, ſucceed very ill, becauſe the Quantity of Soil is ſo ſmall; for the Roots of Corn never penetrate among the Stones: but the raiſing Saintfoin on them, ſerves as a Kind of fallowing for them. After this Herb has grown ſeven Years on them, which it will very well do, they will yield there good Crops of Corn, and may then be laid down to Saintfoin again very advantageouſly.

Theſe deep-rooted Graſſes are of the ſame Benefit to all Soils, that they are to this light and ſtony Kind; ſome may want the Aſſiſtance more than others, but they are uſeful on all: and after their own great Crops, they prepare the Land for Corn better than almoſt any other Method.

If a Piece of rich Land be drill'd with Saintfoin, ſix Gallons of Seed being allowed to an Acre, and ſow'd in nine Inch Rows, it may be mowed annually with very great Crops; a ſingle Crop ſometimes yielding four Pounds an Acre: and after it has ſtood thus ſeven Years, the Land may be plowed up, and will be ſo rich, that inſtead of requiring to be fallowed or dung'd for Wheat, the Farmer will be obliged to ſow that upon Barley Stubble, and to turn in his Sheep in Spring upon it, to prevent its being too rank.

This, which is a Fact proved by many Inſtances, may ſerve as a Proof of the vaſt Advantage of preparing Lands for Corn by theſe artificial Graſſes; for the Saintfoin will be not only in full Perfection theſe ſeven Years, but would be able to ſtand much longer; and no fallowing would have prepared the Ground for Corn like it.

The beſt Method for preparing the Land for Corn after this Growth is, by firſt ſowing it with Turnips; and I would have my young Huſbandman go through it in this Manner. Let him plow it up in Winter with a four-coulter'd Plough, and get it in order for the ſowing of Turnips for the following Seaſon. When the Turnips rais'd upon it are in Growth, let them be well hoed; and let them be eaten by Sheep, upon the Ground. This will bring the Soil into excellent Order for Barley, in the following Spring.

The Farmer will often find it anſwer his Purpoſe, to raiſe Saintfoin upon a Piece of Ground for a Continuance. In this Caſe, when it grows old he muſt take it up, and ſow Corn to prepare it again. The Method we have here directed is the beſt he can poſſibly follow for that Purpoſe; and when he ſows his Barley it may be done by drilling, and the Saintfoin with it.

The ſame Preparation does when the Land is intended for Corn for a longer Time. In this Caſe let the Huſbandman take Care that the Ground be very well tilled, for otherwiſe the firſt Crops will be very poor. Saintfoin prepares Land excellently for Corn, but there muſt be good Tillage at the breaking of it up, or elſe the Advantage will not be perceived. There have been Examples of thoſe who have omitted this Care, and they have found the Want of it. Even Oats will not grow upon it to any Profit, without this good Tillage. Some have ſown a broken-up Saintfoin Ground with white Oats, upon once plowing: but if the Summer prove a dry one there will be no Crop at all, and if the Seaſon favour ever ſo much it will be a very poor one.

From theſe Inſtances, which through the Backwardneſs of the Farmers to receive proper Advice, have too often happened, ſome have been led to diſpute whether theſe artificial Graſſes do, in reality, enrich Land or not; but thoſe who will not follow proper Meaſures, when they are pointed out to them, are not to deny the Effects that would have enſued if they had: thoſe who have taken the proper Care in the ſucceeding Tillage, have always found that theſe Graſſes left the Land fit for any Produce. This is ſo plain in Fact, that it has been us'd againſt the Syſtem of Earth being the Nouriſhment of all Plants, and the ſame to all.

It has been ſaid, becauſe Saintfoin leaves the Land rich for Wheat, therefore Saintfoin draws a Nouriſhment different from that of Wheat, leaving what would have been drawn by Wheat all there: but this has been already ſhewn to be an Error.

Some have ventur'd to ſay, that this deep-rooted Graſs ſpreads no Roots or Fibres in the upper Surface of the Earth: and therefore leaves it unexhauſted: this is one great Reaſon, but they carry it too far, who ſay this Graſs ſends out no Fibres into the upper Part at all.

It is true that Saintfoin roots very deep. It has a ſingle long and large Root which penetrates, counting the extreameſt Fibres at leaſt fifteen Foot deep into the Ground, and it doubtleſs draws a great Part of its Nouriſhment from theſe Depths. The Plant does ſend out Roots into the upper Soil, but that is a ſmall Part of the Ground among which it ſpreads, and only a proportional Share of its Nouriſhment is derived thence; ſo that the Caſe being fairly ſtated, this Soil enjoys a Kind of Fallow, becauſe it affords but a fifteenth Part of the Nouriſhment to the Growth that is upon it. This is the true State of the Caſe, and they wrong a good Cauſe who would make it otherwiſe.

We allow therefore that theſe Graſſes do draw ſome Nouriſhment from the Soil in which Corn is to grow, but this is but in ſmall Quantity, and it is over-balanced by another Conſideration, which is the ſecond Crop, or After-Leaſe, being eaten by Cattle upon the Ground. There is a great deal in this: ſo much, that upon the whole there is Reaſon, as well as Experience, to ſhew that a Piece of Ground planted with theſe artificial Graſſes,

Graſſes, and properly managed in the ſpending of them, and in the Tillage afterwards, is left in as good a State by this Growth, as if it had been in Fallow. It muſt not be objected to this, that the lower Parts of the Earth are not ſo fertile as the upper; ſo that the Roots of theſe Graſſes cannot draw ſuch Nouriſhment from them as from the others; we have allowed for that in the Computation, for we are not to reckon the Soil at a Foot deep; and though this lower Earth is not ſo rich as the upper Part, yet being freſh, and never exhauſted of what it had, it will ſupply a great deal to the firſt that come there: the Roots of Corn never pierce to it, ſo that the Roots of theſe Graſſes are the firſt that come, and they will therefore have Nouriſhment.

CHAP. XIX.

Of the Preparation of Land for Corn, after common Graſs.

COMMON Graſs has not the Advantage of thoſe artificial Kinds laſt deſcribed, in preparing Land for Corn, becauſe its Roots do not pierce to any Depth for their Nouriſhment, but ſpread in a vaſt Quantity near the Surface, in ſuch Manner that it ſhould ſeem they would exhauſt Land more than any other Growth: but this does not prevent the Ground from being very ready to bear Corn, and even to bear it in Abundance, provided it be good in its own Nature.

There is one Reaſon why Paſture Ground retains a Richneſs, that is ready to ſupport and nouriſh any Crop, which has been named in its Place, and needs only be refer'd to here; that is, that in plowed Lands, eſpecially ſuch as lie upon a Deſcent, the Rains waſh away a great Part of the fine Mould; whereas all is retain'd in thoſe cover'd with Sward, and whatſoever is brought on by Accident with it; as the Waſh from higher Grounds, the Mud from the Over-flowing of Rivers, and the like.

For theſe Reaſons a tolerably good Paſture Ground is always ready for Corn, when any one chuſes to convert it to that Uſe.

The proper Seaſon for doing this is in the Month of January; and the Farmer ſhould take an Opportunity to do it after Rains, for when the Land is well wetted, the Turff is tough, and it will hold to turn without breaking, which is an Article of great Advantage in the plowing it.

A very experienced Plowman ſhould be employed on this Occaſion, for no Part of that Buſineſs requires ſo much Skill and Nicety; and the Eye of the Maſter ſhould be over him, to ſee that he lay the Turff he turns up flat and true. If this be done in an artful Manner, one can hardly ſee where the Plow paſs'd, and this is the Proof that it is done perfectly.

But beſide a good Workman there ſhould be a good Plow on this Occaſion; for without that no Art in the Man will make the Work go on well. If the Earth Board do not turn it well, a Piece of Wood is to be nail'd on it, to take the upper Part of the Turff as it riſes; this will never miſs to throw it over with the Graſs Side downward; and the Maſter ſhould look on till he ſee that it be ſo prepar'd, that this Purpoſe is fully anſwer'd.

The Advantage of this is the rotting of the graſſy Part, which decaying, becomes a Kind of Manure, as has been ſhewn already; every vegetable Subſtance, in a State of Decay, being an enriching Article added to the Earth. But this is only the firſt Step toward the preparing the Land for Corn. That is to be compleated by repeated Plowings, and the more of theſe it has, proper Intervals being allowed between one and the other, the better it will be fitted for the Growth of Corn.

This breaking of the Ground by the Plow, or whatever other Inſtrument, is properly what we mean by Tillage; and theſe repeated Plowings are called Dreſſings of the Land. Many uſe the ſame Word to expreſs the laying on of Manures; and in that Caſe alſo, in Concurrence with the common Cuſtom, we have us'd it in that Part of our Work which treats of that Head; here it means only the turning or breaking of the Ground.

Every Time the Earth is thus turn'd, the Particles of which it conſiſts are broken in a greater or ſmaller Number; the more of them the better: and it is on this Principle that the plowing of Lands that have fed a large Sward of Graſs, prepares them for Corn.

We have ſhewn that the Nouriſhment of all Vegetables is fine Earth, which they imbibe from the Surfaces of the little Particles among which their Roots ſpread and run. When theſe Roots have taken up all the fine and ſmall Mould that lay about the Surfaces of thoſe Particles where they ſpread, then the Soil is ſaid to be exhauſted. It may be renewed by the Addition of Manures, which ferment and divide its Parts, or by the Action of the Plow which breaks them; either Way they are broken, and conſequently new Surfaces are made among them. Theſe have new earthy Particles upon them, ready to be abſorbed by the Roots of a new Crop, and therefore a new Crop thrives, being ſown upon that Land.

This is the Doctrine of exhauſting and refreſhing of Land; and it is of the breaking it by the Plow we ſpeak in this Place. This is done in ſome Degree by every plowing, but moſt perfectly by the beſt, and by the moſt frequently repeated. A ſlight plowing moves and divides the Particles of Earth, without breaking many of them; but ſtill this is of Service, for where they are ſeparated one from another, though not broken, there is a new Surface at the Diviſion of them, and this anſwers ſome Purpoſe, though 'tis not ſo much as will be done by better plowing.

We have ſaid, that in the preparing a common Paſture for Corn, there muſt be careful and good plowing; the Reaſon is this, the Ground has lain a great while untouch'd or undiſturbed, and the Surfaces of its Particles have been well drain'd of their Nouriſhment by the Growth of the Graſs. Theſe Surfaces could not yield Nouriſhment for Corn; but when the Ground is well turn'd and divided, the Particles are broken, new Surfaces

are formed, which the Graſs being deſtroyed, does not exhauſt; in this Condition the Corn finds it only improved by the Effect of the rotted Graſs, which ſerves as a Kind of Manure. Therefore in this ſingle Act of breaking up the Ground of a Paſture for Corn, provided it be well done, there is the Advantage of entirely new Particles, and new Surfaces in great Abundance; and of Manure. This agrees with our Plan perfectly, which is not to prefer one Method before another, but to uſe both.

If any one wonder that the ſame Land ſhall continue to be refreſhed by Tillage after repeated Crops, as ſuppoſing that this turning and breaking of the Particles, when repeated ſo often, muſt come to no more than the turning up the old Surfaces again; he errs in the Principle, for the Earth is diviſible without End, and no Art could bring about what he ſuppoſes happens by Accident: the ſame Surfaces never can appear again in a Thouſand Plowings, becauſe the Particles of the Earth form every Time new Combinations; and every new Surface anſwers like the firſt: all ſupply Nouriſhment equally; and every Time the Earth is turned up and broken well, it is like freſh Earth.

Let not the Huſbandman who has a Piece of Graſs Ground to plow for Corn, queſtion whether the Soil be fit for that Purpoſe, for every Soil that will bear tolerable Graſs, will alſo ſupport Corn. Nor on this or any other Occaſion, let him ſuppoſe the Kind of it diſables him from having Recourſe to this Aſſiſtance of Tillage, for we have ſhewn that it agrees with both; and Experience ſhews, that on light Lands two or three additional Plowings will anſwer the ſame Purpoſe as dunging of it; and the Coſt is not more than a fifth Part of the other. This is ſo plain from the Experiments that have been made, that it is getting into Practice in ſome Places, and has obtained the Name of double Plowing.

It has been found, that if a Field prepared for Barley in Spring, be not ſowed with that Grain, but plowed on to Wheat Harveſt, the Crop of Wheat will be ſurprizing; and in the ſame Manner when Crops of Turnips fail one after another by the Fly, the Ground thus frequently plowed, bears Wheat to a Miracle without Dung.

People that are very ſlow to take Advice, will be led by Experience, and this is the moſt plain imaginable. From this Effect of thorough Tillage without Manure, it is extreamly evident that there will require no Aſſiſtance to the Plow in preparing Graſs Land for Corn, only let the Plow not be ſpared. The Work ſets out with a natural Manure, and it will be a great while before the Land, if properly tilled, requires any other: but when it is ſeen to require any, let not the Fondneſs for a Plowing Syſtem deny the Uſe of it: the Benefit ariſing from the Uſe of the four coultered Plow on theſe Occaſions, we ſhall ſhew hereafter in its Place. As much as we here ſay in Favour of Plowing often, we have before ſaid of Manures, and the Farmer ſhould carry both in his Mind together; and uſe the one to the Aſſiſtance of the other, when required, that he may take every Advantage for the making the moſt of his Ground without damaging it for the Owner.

CHAP. XX.

Of keeping Land in Heart by Tillage.

THE Farmer will obſerve that we do not recommend to him to depend upon Tillage only, for the keeping his Land in Condition to bear Corn, tho' that has been propoſed as poſſible, and is ſupported by Experience. Plowing and breaking the Ground will do this, but the Aſſiſtance of Manures will make it anſwer the better. And ſometimes one Method, and ſometimes the other are to be uſed, according to the Circumſtances, as ſhall be directed under the proper Heads.

Having thus premiſed our Advice to have Recourſe to other Methods as well as this, we ſhall now tell him what may be done by this Method alone.

As new broken Earth is the ſame Thing with freſh Earth, to all Intents and Purpoſes, provided it be ſufficiently broken, there is no Queſtion but Tillage will ſupply the Place of Manure; for it will always break the Soil: light Soils, as before obſerved, when well broken by Tillage, become cloſer and heavier, becauſe it brings their Parts nearer together; and heavy or ſtiff Land is made lighter by it, becauſe the breaking and dividing of this, naturally renders it leſs tough, that Fault being nothing but the too great Coheſion of thoſe Particles. But in order to obtain this Advantage for either Soil, the Tillage muſt be ſufficient: for otherwiſe, ſtiff Lands half tilled, have large Cavities, which is the very Fault of too light Soils; and, in the ſame Manner, an imperfect Tillage of a light Soil leaves it rough, and very much of the ſame Nature with the half tilled ſtiff Land: both being in this Condition, full of large Pores and Cavities, which we have ſhewn are not proper for the nouriſhing of Plants.

We mean by this to ſhew the practical Huſbandman, who ſhall in any Reſpect depend on Tillage for the Improvement of his Land, the Neceſſity of ſufficient Tillage, otherwiſe he will deceive himſelf; and perhaps blame that Practice which he has not followed.

The common Kind of light Land, ſuppoſing it to have been in Graſs, as in the laſt Chapter, becomes a great deal lighter for an imperfect Tillage; the Pieces of Turff that remain turned under and not broken, make large Hollows, and increaſe its Lightneſs, and render it in all Reſpects worſe than it was before the Tillage. But when the Farmer has ſuch a Piece of Ground, and finds he has hurt it inſtead of improving it by this Method, let him not be diſheartened, but go on; let him till it more till all theſe Pieces of Turff are broken, and it is altogether fine, and he will then find it anſwer very fully to his Expectations. This Kind of Land has a great Advantage over the ſtiffer Sorts, becauſe it is to be tilled with leſs Labour and Expence, working eaſily: and it anſwers excellently, for it becomes ſtronger than at firſt, and is often more

profitable to the Farmer than Land of a better Kind, that requires more laborious Tillage.

It is obſerved, that in very light Soils Crops ſuffer extreamly in dry Seaſons; and eſpecially after Rains have fallen for ſome Months, as is ſometimes the Caſe; and theſe very dry Seaſons ſucceed. But this Accident happens to them only in Proportion as they have been imperfectly tilled; and when the due Care is taken, not at all.

The Fault of light Lands is the having large Cavities; theſe, when the Ground is wetted by long Rains, are full of Water, and that Water touching the Roots in every Part, ſupplies the Plant with Nouriſhment; but when the dry Weather follows, and they become empty, the Roots do not touch their Surfaces, and cannot be nouriſhed, ſo they fade and decline. But good and perfect Tillage prevents the Earth from having theſe large Cavities, and therefore it remedies this Evil. In theſe, and in all others, the Way to bring them to good, is by beginning with deep, thorough, and good Plowings; and the Way to keep them in Heart is to repeat the ſame Practice.

The Effect of frequent Tillage is to make the Pores or Cavities between the Particles of Earth where the Roots ſpread, numerous and ſmall; they cannot be too numerous, or too ſmall, and therefore the more Tillage is given, the better; for the more there is given, the ſmaller and the more numerous they will be: theſe Pores cannot be too ſmall, when made by Tillage, becauſe the reſt of the Earth being light and looſe, the Roots of the tendereſt and fineſt Kinds will make their Way in them; whereas in a natural or untilled Earth, they may eaſily be too ſmall, and often are ſo, becauſe the Earth all about them is hard. This is the Advantage a tilled Ground has over the beſt natural Soil.

In order to the keeping a Piece of Ground in Heart by Tillage alone, we have ſaid that ſhould be done frequently and well: but theſe are Words at large, and convey little direct Inſtruction, unleſs explained. Nothing is ſo common in Books that teach a Science, as to ſay what is to be done, without telling the Reader how to do it. This is a Fault we hope we have hitherto avoided, and ſhall endeavour to avoid throughout.

The firſt Plowing in the uſual Way anſwers very little Purpoſe, nor does the ſecond do much more good. Theſe two firſt, if done with common Plows, and in the common Manner, cannot ſo properly be ſaid to be Tillage, as to prepare the Land for Tillage: the third and fourth Plowings are done at much leſs Expence than theſe two firſt, and they are of much greater Benefit to the Land: every Plowing that is given after theſe, does more and more Service, and comes at leſs and leſs Expence. This is ſufficient, one would think, to recommend them to the Farmer; and their Effect is certain. We ſee that nothing prepares Land for Wheat in the common Way but frequent Plowings: and when they come thus eaſy, why will not the Farmer give more of them to his Wheat Land, that his Crop may thrive the better; and give them alſo in proper Quantity to his Lands that are prepared for any other Seed, as they will be ſure to return the Labour with ten-fold Increaſe.

When a Land has been put into a good Condition by Manure, nothing aſſiſts the Effect of that Addition ſo much as good Tillage; a Piece of Ground prepared in the common Way with Dung, will be exhauſted in three Years, according to the common Methods; let it have double Tillage, which is an Expence nothing near the Price of a new dunging, and it will keep in Heart ſix Years; and with more, longer.

In ſhort, there is no Way of managing Land to the beſt Advantage, but by the Uſe of both. Manure ſhould be called in when a Land has been long kept in Heart only by Tillage; and Tillage, in this increaſed Degree, ſhould be called in to preſerve and continue the Effects of Manure. Nothing is ſo idle as the propoſing one againſt the other: there is no Reaſon the Farmer ſhould not uſe both, for they never interfere with one another. We hope we have ſhewn him ſo far the Nature of Soils, the Virtues of Manures, and now laſt of all the Benefits of repeated Tillage, that he will be able to call in one or other alone, or both conjointly, as he ſhall find moſt likely to be beneficial.

This is certain as to the keeping a Land in Heart by Tillage, that it is only to be done by allowing it a ſufficient Quantity of Labour: the more it is allowed the better, there being proper Intervals of Reſt between; and this is certain, that a Piece of Ground may be thus not only kept in Heart, but made ſtronger and better; for the finer Land is made by Tillage, the richer it will become, and the more Plants it will ſupport, and the better it will maintain them; that is, the better and larger will be the Crop.

CHAP. XXI.

Of the Nature of the Improvement by Tillage.

THE finer an Earth is made by Tillage, the more it is enriched by the common Advantages of Dews, Rain and Air. Theſe penetrate into every Part of a fine well tilled Piece of Ground, ſo that when it comes to be turned again, and freſh broken, all the new Surfaces that are formed by breaking the Particles, are rich and full of Nouriſhment; this is not the Caſe in tough and hard Lands, for the Dews and Rains do not penetrate them: and this ſhews the Advantage of continued and repeated Tillage.

In very dry and light Lands, the Inſtruments of Huſbandry cannot take Effect in breaking or dividing them, for their Particles give Way to the Plow without breaking, and at the utmoſt are only turned. The Author of the Horſehoeing Huſbandry is aware of this; and he declares, ſuch Lands do not deſerve the Name of Arable, but ſhould be reputed Deſart, ſcarce deſerving the Name of Land, like the Deſarts of Libya, except by way of diſtinguiſhing them from Sea.

This

This is a ſpecious Way of talking, and were there no other Huſbandry in the World but the Horſehoeing Kind, it would be true; and the Farmer who happened to have ſuch Ground in his Hands, muſt leave it uncultivated. But this may ſhew the Inſufficiency of that Author's Scheme of making the Horſehoeing Huſbandry univerſal, even from his own Confeſſion.

We have ſhewn how ſuch Land, as he ſays ought not to be called Arable, and indeed is not capable of being brought to any Uſe upon his Plan, may by another Method of Huſbandry be improved ſo as to yield large Crops; and we may tell his Admirers, that by ſuch Management as has been directed for barren ſandy Lands in the preceeding Parts of his Book, the very Deſarts of LIBYA might be made to yield excellent Crops of Corn.

So eaſy an Addition as Clay to a ſandy Ground, reduces it to Loam, and Loam is fertile; and Furzes may be raiſed for a Fence. In ſuch an Incloſure ſo made, and ſo manured, Corn will grow, therefore this new Scheme is not univerſal: it will aſſiſt the old Methods of Huſbandry, but it will not ſupply their Place, and it is thus we recommend it to the Farmer: not as his only Practice, but as one that he ſhould underſtand as well as the others; one that deſerves to be uſed much more than it is; and that will often be of vaſt Service.

We ſee in this laſt Inſtance, that the Land cannot be brought into Heart by Tillage alone, even upon his own Confeſſion; this Sort of Land then muſt be brought into a Condition upon the Principles of the old Huſbandry; that is, by Clay, and the proper Manures, but it may be kept in Heart by Tillage.

In this Caſe the Method propoſed by Mr. TULL, has great Advantages attending it, tho' it will not ſucceed alone. This Land will be better kept in Heart by the new Tillage he propoſes, than by the old, becauſe the new is the more perfect. The Soil is made leſs fine in common Tillage, therefore the Advantage will be leſs; but in the Tillage he propoſes it will be more fine, and conſequently, the Effect will be greater.

We cannot ſee a greater Inſtance of the Effect of Huſbandry any Way, than by the Obſervation of ſuch a Piece of Land as this. The Farmer upon the Principles of the old Huſbandry, adds Clay to it, and by this Means converting it into Loam, he may be ſaid to make a Soil. When he has thus made it, it is in the Condition of one that is better by Nature, and it is now fitted for the new Improvement by a more perfect Tillage. It could not receive the Advantage of that Method according to the Confeſſion of its Author in its natural State; but it may in this improved Condition. We ſee therefore how uſeful it is to the Farmer to know every Practice, and not to ſtick to any one, but to employ them all as there may be Occaſion. 'Tis thus we propoſe them to him for his general Uſe. He ſees in this Inſtance he may make a Soil by the old Methods, and he may keep it in Heart by the new; ſo that the one ſhall continue to him thoſe Advantages he received from the other.

The two great Articles in providing that Plants ſhall have Nouriſhment, are, that the Roots may ſpread freely to their full Extent, and may every where have the due Preſſure in the Ground. Theſe are effected excellently by Tillage in a compleat Way, for the Earth is made fine and ſoft: it lets them in any where, and it cloſes every where about them. All the Earth is full of Nouriſhment for Plants, and their Roots are thus put into a Condition to ſearch for it, and receive it. If they could not ſpread by reaſon of the Hardneſs of the Ground, they muſt be content with what is ſupplied by the Earth juſt about them; and if they ſpread ever ſo freely, and paſs where there is ever ſo much Nouriſhment, they cannot get it unleſs they come to touch the Surfaces whereon it lies; and this they cannot do in half-tilled Ground, becauſe the Cavities are there ſo large, that the ſmall Roots paſs through them without touching their Sides. We repeat this upon the preſent Inſtance, that the Farmer may perfectly underſtand it, and remember it; for this is the Principle on which he is to act in the new Method of Tillage.

Let him be ſure therefore never to ſpare Tillage; the Land being poor is no Argument againſt his employing it: for the poorer the Land the eaſier it is wrought; ſo that there is leſs Expence in the Tillage; and if the Crop be not equal to that upon better Land, neither is the Rent.

The great Miſtake of our Farmers, is their not giving their Land ſufficient breaking; and in this they err very unhappily, for they go thro' the laborious and expenſive Part, which is that of the firſt Plowings; and they then leave off juſt when the Remainder is moſt wanted, and would be moſt eaſy as well as moſt advantageous.

They ſuppoſe the Soil to be fine enough when the Harrow will cover the Seed; as if the Covering of that were the only Uſe of the Fineneſs of Land. To give the Crop a due Benefit from the Land, every Lump of it ſhould be broke; for though the Seed may be buried among theſe, and covered in an irregular Manner, yet the Roots which ſhoot from it will never be able to penetrate thoſe Lumps, and they are of no Service to its Vegetation; whereas if the Tillage had been continued till theſe Lumps were broken, every Particle of the Soil would have been made uſeful; and the Crop would have had the Advantage of double, treble, or ſometimes much more Land in the ſame Field.

The Harrow is an Inſtrument that often miſleads the Farmer greatly to his Hurt. He ſuppoſes he can tear the Soil to Pieces with it; whereas, on the contrary, the Horſes that draw it frequently do much more Harm by their treading, than the Harrow does good. Let him never depend upon this Inſtrument for breaking the Ground; let him uſe it ſparingly and cautiouſly, and then it will be of Service; but much better Things than that will become hurtful upon improper Management.

The Roller may be mentioned as another Implement that often does Harm, though it may do a great deal of Good when properly uſed.

The

The Seaſon is all in all on this Head. The Buſineſs of Tillage we ſee is to break the Land, and divide its Parts; and this may be aſſiſted by the Roller, if uſed at a proper Seaſon, or otherwiſe it may be impaired by it. If the Roller be uſed in wet Weather, it preſſes down and cloſes the Soil inſtead of raiſing and opening it: but if uſed only in dry Seaſons, it breaks the Lumps, and does a great deal of Good.

We ſhall ſpeak of this more largely hereafter, but it was neceſſary to name it here where we are treating of the keeping the Ground in Heart by Tillage. If the Harrow be uſed firſt to tear up the Clods, then the Roller to break them, and the Ground be afterwards plowed again, and all this in dry Weather, no Kind of Tillage anſwers better, nor more tends to render the Earth fit for the ſucceeding Crop.

BOOK VI. PART III.

Of the Inſtruments of Huſbandry, and their ſeveral Uſes.

CHAP. XXII.

Of Plowing.

WE have explained in the preceeding Parts of this our Sixth Book, the Principles on which the Tillage of Land are founded, and the Means on which the Succeſs of that Treatment will depend. This may be called the Theory of Tillage; from which we now come to the Practice: nor would that Theory have been allowed ſo much Room in this Work, but that the Practice depends for its Succeſs entirely on the underſtanding it: and nothing is of ſo much Importance to the Farmer.

The Knowledge required for the Management of Graſs Grounds is comprized in a ſmall Compaſs, as will be ſhewn in its Place; and the Expence and the Hazard are both little. On the other hand, the Management of Arable Land is the Height of his Buſineſs. It requires the moſt Knowledge, and it demands the moſt Expence; therefore he is to endeavour by all Means to make himſelf a Maſter of it. The Profits ariſing from this Branch of his Profeſſion, if rightly managed, are much greater than from any other; but if he ſet about it ignorantly, the Loſs will be great alſo, and his Ruin may be the Conſequence.

All that has been hitherto ſaid is but preparatory to this Article; let him therefore apply the Knowledge he has acquired already, to the underſtanding this, and to the conducting himſelf in his Work according to that Underſtanding.

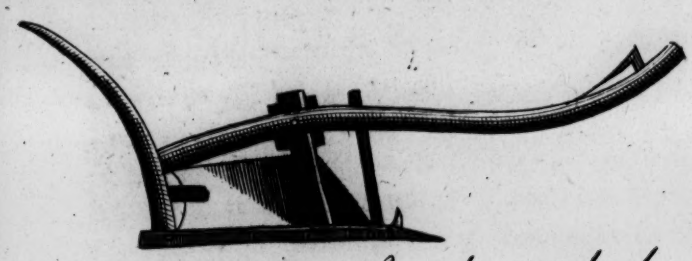
All Soils are not to be wrought in one Manner; if they were, the Knowledge of Huſbandry would be eaſy. But as each Kind has its particular and appropriated Manures, as has been ſeen already, ſo each Kind requires alſo its particular and appropriated Manner of Tillage. Plowing is the great or capital Operation of Huſbandry; and according to theſe Differences of Soils, and the particular Treatment they require, there have been invented different Sorts of Plows, which are ſeverally uſed according to the Nature of the Ground in different Places, and which ſhall be deſcribed in the ſucceeding Chapters.

There is great Difference between a tough Clay, and a light and looſe Sand: one of theſe Soils requires one and another Kind of Plow, and of plowing; neither would any uſe the ſame Inſtrument to till a deep Soil, and one where there is at five or ſix Inches Depth a Bed of Stone. There is often a Bed of barren earthy Matter alſo at this ſlight Depth, and this is not to be brought up with the Soil. All theſe, and a Number of other Particularities, demand their different Manners of plowing; and in order to its being rightly done, the Farmer is firſt to ſee there be a proper Inſtrument, and next to follow the Work with his Eye, that the Inſtrument be properly uſed: that the beſt Part of the Soil be not left untouched where it lies deep; nor the barren Part raiſed up where that lies ſhallow.

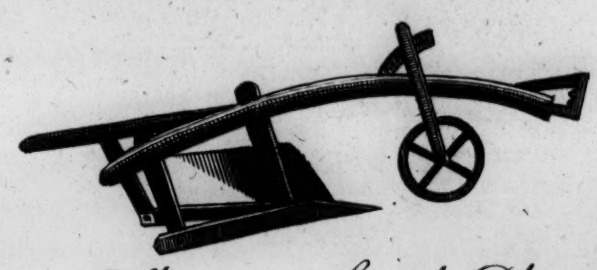
Theſe light and ſhallow Soils work eaſily, and coſt little in Tillage; but then they are often ſo poor, that they require a large Expence for Manures. Tillage alone, as we have ſaid, will make almoſt any Land bear Crops; but Manure is to be added to theſe, that the Crops may be great.

On the other hand, the firm and tougher Soils depend more upon Tillage than any Addition of Manure. In theſe, Plowing comes dear, but the Expence in the other Article is ſo much leſſened.

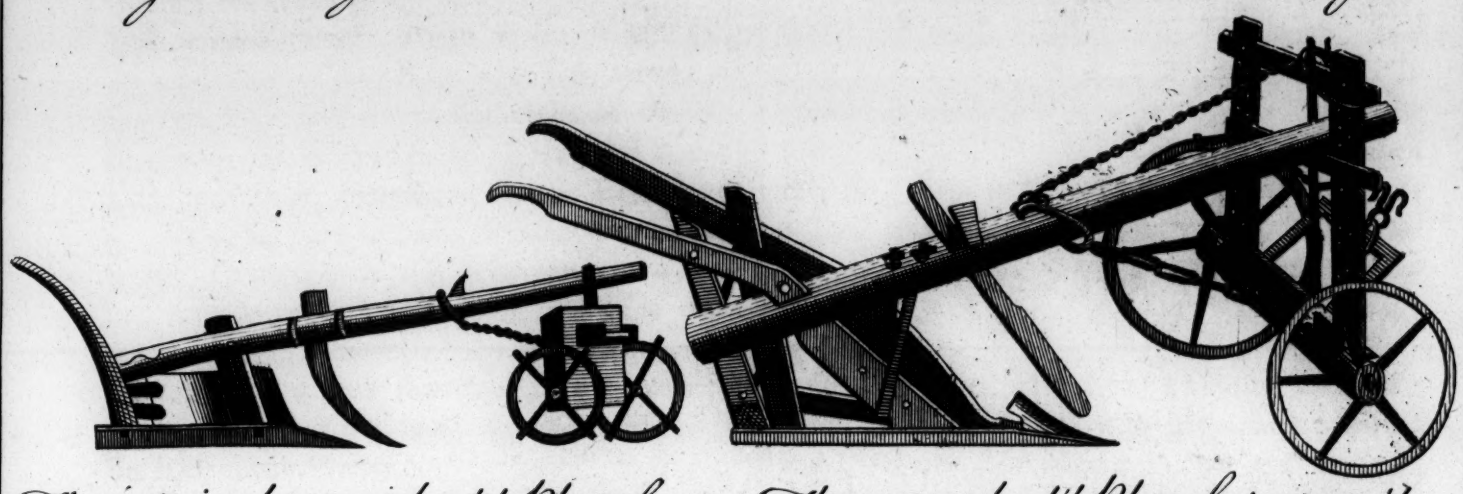
All that has been hitherto ſaid concerning Plowing, regards the Time before ſowing the Land; but we are to mention alſo under the Head of Plowing, another Species of Tillage, which is performed after the Plants appear; this is, properly ſpeaking, not Plowing, but Hoeing; though, according to the new Method of performing it by a Kind of Plow, and with the Aſſiſtance of Horſes, it has got the Name of Plowing. This is the Kind of Tillage called Horſe-hoeing Huſbandry, of which we ſhall give the Reader a full Account among the ſeveral other Methods. It has its Foundation upon very rational Principles; and its Succeſs anſwers accordingly: but there is a Backwardneſs of bringing it into Uſe, which ſeems to ariſe only from its Novelty. In other Countries where they are more ready than we to try Experiments, it is got into Uſe, and we can aſſure the English Farmer with great Advantage. We hope therefore to ſee it ſoon introduced in the proper Soils, and under proper Circumſtances, here.



The original Plough without Wheels.

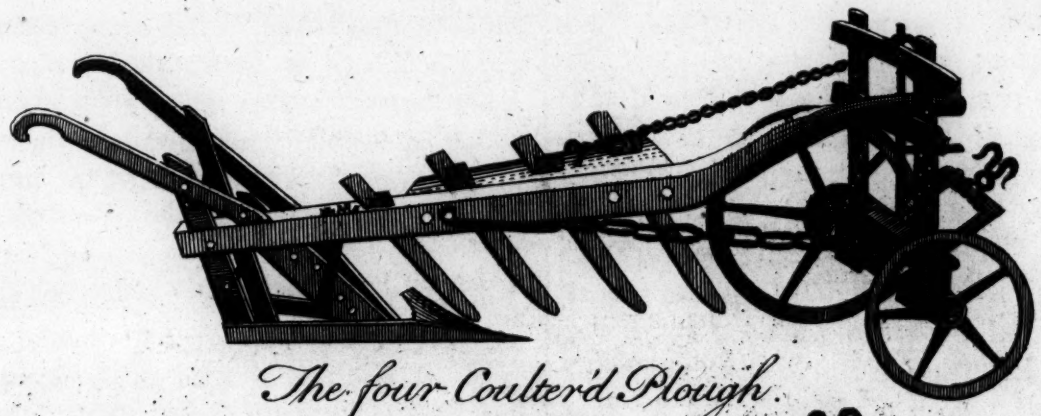


The one wheel'd Plough.



The original two wheel'd Plough.

The two wheel'd Plough improv'd.

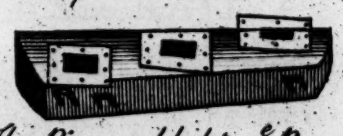


The four Coulter'd Plough.

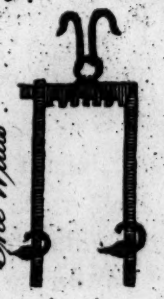
The long Handle.

The fore Sheet.

The Square Collar.



The Piece added to y^e Beam.



The Wild.

The hinder Sheet.

The Brook.

A Nut.

The short Handle.

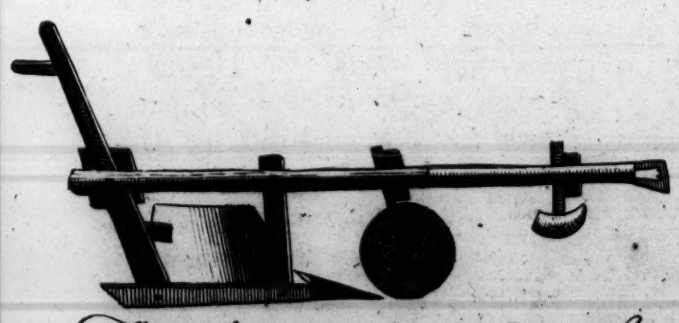
A Coulter.

Parts of the four Coulter'd Plough.

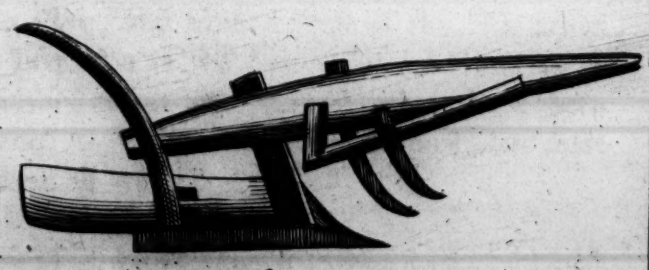
The Ground Wrist.

The Earth-board.

The Share.

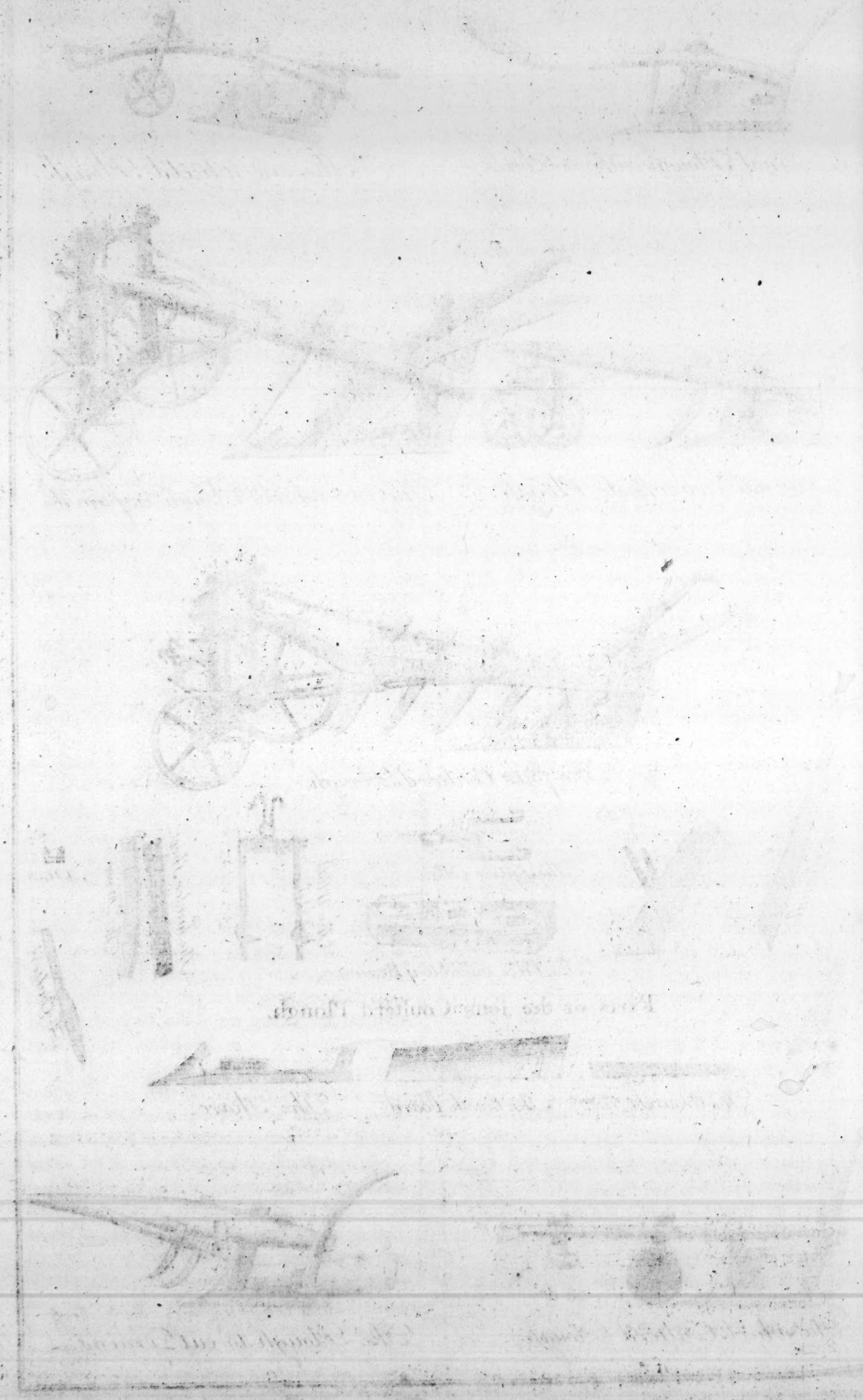


The wheel Coulter'd Plough.



The Plough to cut Drains.

Engravid for The Compleat Body of Husbandry, Printing by the King's Authority, in Weekly Numbers, at 6.d each.



CHAP. XXIII.

Of the Form of the antient Plow.

WE may ſee in this Matter of the Plow, that the moſt uſeful Things are neglected, if they be common; and thoſe who have it in their Power to be of greateſt Service to the World, by conſidering and improving them, leaſt regard them. There is no ſuch Thing as an Author of any Note who has written on the Structure and uſeful Variations of this Inſtrument; nor have Men of Genius and Knowledge concerned themſelves in the Fabrick of it. Ploughs ſeem to have been invented in the rudeſt Times; and, till very lately, to have had little Improvement. What has been done on this Head, however, by ſome ingenious Perſons within theſe few Years, ſhews what is practicable; and we hope will lead others to the ſame uſeful Purſuit.

The firſt Kind of Tillage was probably with the Spade, and were that as convenient for large Quantities of Ground, as it is uſeful where it can be properly employed, no Inſtrument in the World could be compared to it. But when whole Fields came to be turned up and tilled, it was natural to deviſe ſome Method of ſaving the Labour of Men; and, conſequently, the Plow, which may be called a Kind of Spade drawn by Horſes, was invented.

As this was more and more frequently uſed, its Form became probably a little altered, but Improvements have been in nothing ſo ſlow: and this Inſtrument of ſuch univerſal Uſe, and vaſt Advantage and Importance to Mankind, is ſtill capable of many more; and it ſtill wants them.

All Tillage we have ſhewn has its Advantage from dividing and breaking the Earth into a great many Parts. The Spade, as it is wrought by the Hand of the Workman, does this moſt perfectly; and it is for this Reaſon that Gardens are more fertile than Fields; but it may not be impoſſible, if proper Perſons will ſet themſelves about it, now that they know in what the greateſt Perfection of Tillage conſiſts, to make the Plow, by more Improvements, equal its Effect.

The Advantage of the Spade over the Plow is, that it goes deeper, and divides the Land into more Particles, and ſmaller: but the Plow, when its Structure ſhall be fully perfected, is certainly capable of this. The four coultered Plow is an excellent Contrivance, and ſhews that there is nothing impracticable in the Thought of forming a Plow that ſhall go deeper, and divide the Earth as much or more than the Spade.

The antient Plow, according to the beſt Accounts we have of it, had no Coulter, nor Earth Board, for the Share always going obliquely, ſerved as an Earth Board; and the two Ears which were the Corners of a Piece of Wood lying under the Share, did the Office of Ground Wreſts.

This Sort of Plow is uſed in Italy, and even in ſome Parts of France at this Time. It ſerves for the turning up of light Land, but it would do nothing with our ſtiff and tough Soils in many Counties.

This, ſo far as we know, was the firſt and original Plow, and it is a very plain and ſimple Contrivance. It did the Office for which it was intended, in the Place where it was invented; but it was not fit for other Lands, and other Countries, and therefore it was altered.

In thoſe Parts of Italy where the Soil is perfectly ſoft and mellow, this Inſtrument does very well to keep it in Tillage; but even in theſe favourable Lands it is very unfit for the bringing them into this Condition; for when they have lain in Graſs, and have any Thing of a Turf upon them, it is very difficult to manage them with it. They are obliged to go two or three Times over the Land before the Turf is all broken.

Theſe Plows, for want of a Coulter to cut the Turf, tear it to Pieces with great Awkwardneſs and Difficulty, but when it is once cut through, the Soil being ſoft and tender, they eaſily get deeper.

As our Soil is very different from that of thoſe Countries, our Plows are neceſſarily made different, for otherwiſe they could not cut it. The Neceſſity of a Coulter to ours is very plain, becauſe of the Thickneſs to be cut, and that Neceſſity was doubtleſs the Mother of the Invention. Our Plows, when well made, cut off the Furrow at the Bottom flatwiſe, and therefore as it is as thick on the Land Side as on the Furrow Side: but the Plow cannot break it off from the whole Land at ſuch a Thickneſs, ſo that there muſt be a Coulter to cut it off. By this Means the Furrow is turned perfectly whole, and no part of the Turf of it is broken. Hence if it lie long without new turning, the Graſs from the Edges will ſpread, and form a new Turf or Sward on the other Side, which was the Bottom of the Furrow before turning, but is now become the Surface of the Earth.

If the Land be left thus, it will ſoon be greener with Graſs than it was before plowing, and the Graſs ſpreading its Roots, will bind it firmly and toughly together; ſo that there will require a great deal of Time and Labour to bring it into a Condition for the Service it is intended to anſwer.

This has ſhewn the Inſufficiency of the common Plow, and from a Senſe of this, has ariſen the Invention of the four coultered Kind, to be deſcribed hereafter. Several others have been deviſed to anſwer the ſame Purpoſe, but none ſucceed ſo well.

CHAP. XXIV.

Of the ſeveral Kinds of Plows in common Uſe in England.

THE common Plow differs very much in Shape and Form in various Places; partly according to the Fancy of the People, and partly to the Nature of the Ground. Some have longer and ſome ſhorter Beams; and there

are great Varieties in the Length and Form of the Share, the Coulter, and the Handles.

In general, without regarding the Cuſtoms of particular Places, there is great Reaſon to have Reſpect to the Nature of the Soil on which it is to be uſed. Thus, in general, the Plow that is for ſtiff Clay ſhould be long, large, and broad, with a deep Head, and ſquare Earth Board, ſo that it may turn up a large Furrow. The Coulter ſhould be long, and very little bending, with a very large Wing; and the Foot long and broad, ſo as to make a deep Furrow. The Plow for moderate Soils ſhould be ſomewhat ſmaller than the former, but broad at the Breech: the Coulter ſhould be long and more bending, and the Share narrow, with a Wing coming up to arm and defend the Earth Board from wearing. The Plow for light Soils, ſuch as ſandy and the like, ſhould be lighter and ſmaller than any of theſe. The Coulter ſhould be more circular and thinner, and the Wing not ſo large.

This is a Direction contained in a ſmall Compaſs, yet it will give the Farmer the general Rule for his Conduct in this Reſpect: let him conſider his Soils under theſe three Heads of heavy, moderate, and light, and in this general Manner ſuit the Bulk and Fabrick of his Plow to them; and he will never make any great Errors.

Plows are ſometimes made with Wheels, and ſometimes without, but in general the Wheels are a very great Advantage; there are Circumſtances in which they are troubleſome, and therefore it is fit they ſhould be in ſome Plows omitted.

The Plow, which from its great Advantage above the others, might be eſteemed the firſt great Improvement in ENGLAND, is the Wheel Plow, that from the Place where it was firſt us'd has been long call'd the HERTFORDSHIRE Plow. This conſiſts of a Beam and Handle, a Neck, an Earth Board, a Sheath, a Share, a Coulter, a Pin, Pillow, and Wheels. Theſe are Parts exceeding familiar to the Farmer, but for the Sake of the Generality of Readers, who may not be acquainted with the practical Part of Huſbandry, they will be explained in the Figures, and we ſhall alſo ſhew how this Plow is form'd, as improved at preſent.

This HERTFORDSHIRE Plow, or common Wheel Plow, as it is uſually made, is very ſtrong, and is ſerviceable for moſt Uſes: it is very eaſily managed, it follows the Horſe lightly, and it ſuits almoſt every Kind of Land. The greateſt Exception to its Uſe is in miry Clay in Winter; becauſe the Wheels cut into them, and clog and ſtick when they are work'd at that Time of the Year. This is fit for that Sort of Ground when Summer Fallows are to be plow'd, and when a Graſs Ground is to be firſt turn'd up for Arable, for it turns the Turf very well, and is very fit for uneven Ground, and for the drieſt Summer Weather. Some make this Plow in the original Manner, with the Handle ſloping of one Side, but this renders it troubleſome to hold, or to follow; the Remedy was very eaſy, and People not bigotted to fooliſh Cuſtoms, have improved it greatly by making it ſtrait.

This is in a Manner the general Plow at this Time, and it is this varied more or leſs, but never much, according to the Pleaſure of the Owner, or Faſhion of the Place, that we ſhall always mean when we ſay the common Plow.

The ESSEX Plow, (for the beſt Way to diſtinguiſh theſe Inſtruments is according to the Places where they are uſed,) has its Earth Board, if the Expreſſion may be allowed, made of Iron; by this Means they make it rounding, and this has a great Advantage in the turning of the Turf, they generally make it light and fine, and the Wheels proportioned. It is in this Way very fit for light Soils, and rids a great deal of Buſineſs. We do not mean by calling this the ESSEX Plow, that they uſe no other in that County; but that is the Place where this Kind is moſt uſed, and ſeems to have been invented.

The LINCOLNSHIRE Plow owes its Invention and Form alſo to the general Nature of the Soil in that County. The Fen Land of that Place is, as we have before deſcribed under the Article of Soils, light, ſoft, and mellow, free from Stones, and naturally over-grown with Weeds and Sedge on the Surface; for this Land they uſe a Plow with a circular turning Coulter, and a large ſharp Share, this is often a Foot broad, and quite ſharp at the Edge. This Plow has no Wheels. There is a Foot at the fore Part of the Beam, which they ſet higher or lower with a Wedge, and by that Means they keep the fore Part of the Plow from growing deeper than they chuſe. And they have alſo Wedges for ſetting the hinder Part where the Handle joins the Beam. The Coulter ſtands in its uſual Place, before the Share, and is a round Iron Wheel, with a ſharp Edge, that turns upon an Axle as the Plow moves, and cuts through the Roots of the Sedge or Graſs as it goes round, while the broad Share cuts the Bottom. This would not do on other Land, but where the Soil is of this free and fine Kind, and is thus cover'd with a tough and tangled Matting of Roots, it anſwers the Purpoſe excellently.

The Dray or Drag Plow was at one Time, in a Manner, univerſal, and there is no particular Place where it can be ſaid to be moſt in uſe at this Time; for it is retain'd in ſome, and rejected in others, according to the Senſe and Spirit of the Farmers in adopting Improvements. It is a very plain and ſimple Kind; but notwithſtanding the Advantage the others have over it, on many Occaſions, this ſtill excells them all for wet Clays in the Winter Plowings; for having the leaſt Workmanſhip of any, it is the leaſt apt to clog, and having the feweſt Parts it is fitteſt for ſuch Ground, where nothing is requir'd but going on, and turning up. It is limitted to this Uſe, for on other Soils, and at other Seaſons, it is very much inferior to the other Kinds. This Plow has no Wheels, and it conſiſts of a Beam, Handle, Earth Board, and Share, and is ſet higher or lower, as they find Occaſion, by Wedges at the Sheath.

In SUSSEX they have a Plow with one Wheel, it is a very ill contrived, and very inconvenient Inſtrument. 'Tis broad in the Breech, and therefore it draws very heavily. It is a clumſy and ill-contrived Kind, that is growing out of Uſe there; and of all the Plows that have been invented, is the leaſt worth introducing any where elſe.

The

The largeſt Kind of Plow us'd in ENGLAND, or perhaps in any Part of the World, is that which, in ſome Parts of the County of CAMBRIDGE, they uſe for cutting of Drains. This is of the Shape of the common Plow, and has no Wheels: it is very bulky in all its Parts, and has two Coulters; one of theſe is fix'd in the Beam as uſual, and the other in a Piece of Wood, faſtened to the Beam for that Purpoſe, theſe both turn inwards, and cut each Side of the Trench. The Share is very broad and flat, and cuts the Bottom of the Trench. The Earth Board is three Times as long as in other Plows, and caſts the Earth a great Way off the Trench. This Inſtrument cuts a Trench a Foot and half wide at the Top, a Foot at the Bottom, and a Foot deep. It is excellent for this Purpoſe on wet Lands, ſaving a great deal of the Expence of Work in the common Way of digging Trenches by Hand, but it requires a great Number of Horſes to draw it. There is ſomething in the Contrivance of this Plow, that may be uſeful farther than in the making of Trenches, and it is for that Reaſon propoſed here to the Farmer's Conſideration.

CHAP. XXV.

Of the Uſes of the common Plows, and their proper Make.

WHERE there is a hard and firm Soil; or where the Land is full of Flints, ſharp Stones, and Gravel, no Plow whatſoever does ſo well as the two wheel'd Kind, which may be ſuited to the Occaſion according to the Directions already given, with Reſpect to Strength: and where ſtrong Clays are to be wrought in Summer Fallows, no other Plow is equal to it. The Point of the common Plow will fly out every Step on theſe Occaſions, but this will anſwer very well when the Earth is ſo baked and hardened by the Sun, that no other will penetrate. The Wheels of this Plow ſhould be about twenty Inches in Diameter, and it will always run beſt if the Furrow Wheel be made a little larger than the other.

A great Advantage of this Plow alſo is, that it will work upon uneven Ground without levelling, ſo that none is equal to it for the plowing up of Paſtures where there are Molehills, and other Irregularities. Theſe diſturb the other Plow extreamly, even the leaſt of them, but this goes through all.

Although the ſingle Wheel Plow of SUSSEX be ſo clumſy and ill contrived an Implement, there is no Reaſon why the Uſe of a Plow with one Wheel ſhould be rejected. A very light and ſlender made Plow may be furniſhed with one Wheel inſtead of two, and it will anſwer excellently on light ſandy Soils. It will not be fit for harder Work, but running eaſily it will ſerve this Purpoſe better than any other.

The common two wheel'd Plow is to be drawn with Horſes or Oxen two a-breaſt. The heavy Plow without Wheels, which is uſeful for wet Clays, and other very heavy and diſagreeable Work is to be drawn by three, four, or five Horſes in Length. The great Uſe of this is where the Ground lies level, and where there are no Obſtructions of Roots, or the like, for theſe greatly diſturb its Operation. The two Wheel Plow is preferable in ſuch Caſes, notwithſtanding all its Inconveniences.

Whichever of theſe Plows the Huſbandman chuſes, let him take Care in the Make of it, that it be ſuited to the Soil upon which he is to uſe it. Let him ſee that it be made larger if it be for deep or ſtrong Soils; and lighter and ſmaller if for the light and ſhallow ones. When the Land is ſtiff and deep let the Coulter be long and ſtrong; in the deepeſt Soils the Coulter muſt go the deepeſt, becauſe the Weeds root deepeſt there.

Of whatever Form, or whatever Degree of Strength, let him ſee that the Iron Work be made true as well as ſound; for on the Exactneſs of this Part of the Inſtrument, depends the going of it true to the Pitch at which it is ſet, and its keeping to the Line wherein it is plac'd, without running out on one Side or the other.

As ſo much depends upon the Iron Work, it is a very prudent Method to have that made firſt, and wrought to a perfect Truth, and then to have the Wood Work made to it: for in the common Way of making the Iron to the Wood Work, the Smith is often forc'd to work wrong in order to ſuit it: in this Caſe no Art will make the Plow go well. Let him take Care that the Iron Work is wrought ſmooth, and rightly temper'd; and that it be kept bright and clean in the uſing.

The ſhorter and leſs the Plow the eaſier it is worked; but though this be a Recommendation in light Soils, there is no uſing of ſuch as have not a due Weight and Strength in tough and heavy Work.

CHAP. XXVI.

Of the Improvements of the common Plow.

THE Regard that has been ſhewn to Huſbandry of late Years, has occaſioned ſeveral Improvements of the Plow, for particular and alſo for general Purpoſes, and ſeveral new Forms and Kinds have been invented, ſome rather fanciful than advantageous, but others extreamly uſeful. There is no Part of Huſbandry in which more Improvement may be made, nor any in which it will be ſo immediately or certainly uſeful.

A double Plow has been invented ſome Years ago, and is at this Time in uſe in ſome Places, by which a double Quantity of Land is plowed at a Time, one Furrow by the Side of another. As this requires twice the Number of Horſes and of Men, the Expence is nearly equal to the Advantage; but this is a Hint capable of Improvement, for although in tough and deep Soils it loſes its Benefit, from the Neceſſity of a double Expence, yet certainly in ſome of thoſe light and ſhallow Lands we have in BUCKINGHAMSHIRE, and other Places, a double Plow might be ſo contriv'd,

triv'd, as to be drawn by two Horſes, and managed by one Man; and then certainly the Advantage would be double, and the Expence the ſame. This has never been put in Practice yet, but from what I have ſeen, I am very certain that it is practicable; and whoever ſhall bring it into Uſe, will be of great Service both to himſelf, and all that ſhall follow him.

There has alſo been a Contrivance of a Plow that turned up two Furrows at once one under another. This I have ſeen uſed, but it is ſo unwieldy, and difficult of Draught, that in its preſent Form it will never get into Reputation, nor is it fit for it; but we have ſeen already, what would be the Advantage of plowing deeper than ordinary, and that is enough to ſpirit up ſome who underſtand a little more of the Mechanic Arts to contrive one upon the ſame Plan with more Judgment. Doubtleſs it is poſſible to obtain this Advantage of deep plowing with much leſs Trouble than attends it in the Plow that has hitherto been contrived for that Uſe.

We have obſerved that the digging with the Spade is a much finer and more excellent Tillage than that with the Plow; and that the Reaſon why our Gardens are more fertile than Fields of the ſame Soil, and with the ſame Manure is, that the Spade digs deeper, and breaks the Particles of Earth finer. Now a Plow conſtructed upon this Plan, with better Judgment in the Fabrick of it, would have both thoſe Advantages: it would dig full as deep as the Spade, and might be made to break the Earth as much. It is ſurely worth the while of thoſe who have a Knowledge in the proper Arts, to devote ſome of their Studies to this Improvement of the Plow, which is doubtleſs the moſt uſeful Engine in the World; and at preſent very deficient, even in its moſt improved State. The adding Breadth to the Fin of the Dray or Foot Plow, will at all Times make it more and more ſerviceable in damp and ſtiff clayey Lands; and in plowing theſe the Horſes ſhould always go at Length, that they may tread leſs of the Ground: on the other hand, in light Soils, the Cattle, whether Horſes or Oxen, ſhould always go a-breaſt, for the double treading is ſerviceable to ſuch Land; in the ſame Manner with the treading of Sheep when they are folded upon it. In ſtony Ground that has Graſs of ſome ſtanding upon it, the Plow ſhould have a round pointed Share, with a Fin to cut the Roots of the Graſs, for the broad Fin is apt to jump out of the Ground.

In Ground that has been Wood, and has Roots remaining; or in other Places where there are a great many large Roots in the Way, it is a very good Method they uſe in ſome Parts of Staffordshire, of having an Inſtrument of Iron, with a ſharp Edge, ſet through the Beam of the Plow, behind the Coulter, and through the Plow-head. This, at the ſame Time that it arms the Plow for cutting theſe Roots aſunder, if rightly fix'd, ſtrengthens the whole Frame of it, and makes it able to bear the rough Work there often is in theſe Places, and which elſe would tear it to Pieces: in other Places thereabout, they uſe a Couple of ſharp Wings of Iron made faſt to the Plow-ſhare, which anſwers the ſame Purpoſe, but does not ſo ſtrengthen the Plow. Dr. Plot, in his Hiſtory of that Country, deſcribes theſe, and gives the Names of their Inventors: I find they are in Uſe ſtill, but not generally. Theſe may give Hints ſeverally, for there is not one of them but has its Uſe, nor one that may not be greatly improv'd.

But theſe are all of them Improvements, which rather ſhew what may be done, than execute it well in themſelves; they may be conſidered as Hints to what is proper, rather than as compleat Things: there remains one to be ſpoken of in which the Improvement is very great, and is carried to a due Degree of Perfection; ſo that the Farmer has no more to do than to order it to be made according to the Deſcription and Figure. This is the four coulter'd Plow, ſo highly and ſo juſtly extolled by the Author of the Horſehoeing Huſbandry.

CHAP. XXVII.

Of the Wheel Plow:

THE Foundation of this Inſtrument is the common two wheel'd Plow, in its moſt improved Condition, from which it differs in the having three additional Coulters; ſo that inſtead of one there are four. We ſhall here conſider this Wheel Plow in its moſt improved State; and in the ſucceeding Chapter deſcribe the four coulter'd Plow form'd upon it. This Plow conſiſts of two Parts, diſtinguiſh'd by the Names of the Plow-head and Plow-tail. The Head has two Wheels of about eighteen Inches Diameter, the Spindle or Axis of theſe is of Iron, and paſſes through a Box which ſtands croſswiſe of the Beam. This Spindle turns round both in the Box and in the Wheels. From this Box riſe two perpendicular Staves, called Crow Staves; theſe are faſtened into the Box, and have each two Rows of Holes, by Means of which the Beam of the Plow is raiſed or ſunk at Pleaſure, in order to increaſe or diminiſh the Depth of the Furrow. This is done by pinning higher or lower a croſs Piece, which is called the Pillow, becauſe the Plow Beam reſts upon it. At the Top of the two Crow Staves is another croſs Piece, called the Gallows. The Crow Staves paſs through this by Mortiſes, and are pinned into it. From the Box of the Plow within the Staves, there is carried a ſmall Frame compoſed of two Legs, and a croſs Top, to which the Links of Iron are fixed by which the Plow is drawn; this Frame is called the Wilds of the Plow. In the middle of the Box there alſo is a Hole into which is let one End of an Iron Chain, the other End whereof is faſten'd to the Middle of the Beam, this is called the Tow Chain, and faſtens the Head and Tail of the Plow together: at the End where it reaches the Beam, this has a Collar that goes round it, and is faſten'd by a Stake within Side the Box. This Stake is held up to the left Crow-ſtaff by a Wyth, which paſſes round it above, and under the End of the Gallows below: a Piece of Cord is ſometimes uſed inſtead of a Wyth: any Thing that may be tied will do. From the Top of this Stake goes an Iron Chain, called the Bridle Chain; this is faſten'd at one End to the Top of the Stake, and at the other to the Middle of the Beam of

the Plow, by a Pin in the ſame Place where the Collar of the Tow Chain paſſes round it.

This is the Structure of the Head of the Plow, and theſe are its ſeveral Parts.

The Tail conſiſts of the Beam, which is a ſtout and long Pole; through which, a little below the Pin that holds the Bridle Chain, and the Collar of the Tow Chain, there paſſes the Coulter, a long and ſlender Iron Inſtrument, which running downward and a little forward, ends near the Point of the Share. This Coulter is fixed in its Hole of the Beam by a Wedge, ſo that it can be raiſed or ſunk at Pleaſure; behind are two Handles, the one longer and the other ſhorter; the ſhorter of which meets the Head of the fore Sheat, where it enters the Beam, and is fix'd by a Pin, and faſten'd to the Top of the hinder Sheat by another Pin. Theſe Sheats are two Boards, the hinder one near the Extremity of the Beam; the other forwarder and more ſlanting, and are both faſten'd to the Share, which runs flat below. On the other Side of the Plow Tail deſcends another flat Board, called the Drock; to this the Groundwriſt is faſten'd, which is a Board running nearly parallel with the Share. The longer of the two Handles is alſo faſten'd to the Drock, and the Earth Board riſes at its Bottom. The fore Sheat is ſupported by a double Retch, which paſſes through the Beam, and is faſten'd by Screws and Nuts.

This is the four Wheel Plow as uſed at preſent in the Places where Agriculture is moſt underſtood, and beſt practiſed: we ſee it conſiſts of more Parts than the two wheeled Plow of HERTFORDSHIRE, according to the firſt Invention, but there is not one of theſe added Parts but is an Advantage in either Strength or Convenience.

CHAP. XXVIII.

Of the four coultered Plow.

WE have ſeen in the laſt Chapter the common Plow in its greateſt State of Perfection; that is, the two wheeled Plow formed upon the beſt Model, and in the moſt artful Manner that has been yet deviſed for it. We are in this Chapter to give an Account of that great Improvement upon it, which, as it adds Parts of the utmoſt Uſe, may very well be conſidered as a diſtinct Inſtrument, its three additional Coulters giving it a Power of breaking the Land beyond any other that ever has been invented to this Time.

The Reader, who by the Aſſiſtance of our Figures and Deſcriptions, has made himſelf acquainted with the Structure and Parts of the two wheel'd Plow, will find no Difficulty in comprehending this.

The Beam of the common two wheel Plow, is uſually eight Feet long; the proper Length of the Beam of the four coulter'd Plow, is ten Feet four Inches. The Beam of the common Kind is ſtrait all the Way, but that of the four coultered Plow riſes with a Bend when it comes toward the Wheels, to where it reſts upon the Pillow. The Beam, ſuppoſing the Plow to ſtand upon a level Surface, would be at the End of the Plow-tail only eleven Inches and a half from the Ground: at the Place where the Bend begins, which is a little before the firſt Coulter, it will be one Foot eight Inches and a half; and where the Beam bears upon the Pillow, two Foot ten Inches. This is the proper Make of the Beam of the four coulter'd Plow.

The four Coulters are thus diſpoſed, meaſureing from the Tail or extream End of the Beam behind. From this Extremity to the Back of the firſt Coulter, is three Foot two Inches; this Coulter has its Point near the Share: from the Back of the firſt, to the Back of the next Coulter, is thirteen Inches; from thence to the third thirteen Inches, and from thence to the fourth the ſame. So that from the End of the Beam behind, to the Place where it begins to bend upwards, which is a little before the fourth Coulter, counting from the Tail, is ſeven Foot. The Length of the additional Coulters, particularly of the fourth, or that next the Head of the Plow, would be a great Inconvenience in this Machine, but that is prevented by the bending of the Beam toward the Head. If the Beam were ſtrait as in other Plows, theſe Coulters muſt be very long to reach the Ground, and they would require to be very ſtrong not to bend, and this would make them expenſive and cumberſome; and at the ſame Time their Length, if ever ſo well form'd, would make them apt to looſen the Wedges wherewith they are fix'd in the Holes. This would make the Coulter riſe up out of its Work, but by this Contrivance of a crooked Beam, a moderate Length in the Coulters ſerve; they do not require any great Thickneſs or Quantity of Iron, and they always work with Regularity.

As to the Materials, the Beam may be made of Aſh or Oak, according to the Nature of the Ground whereon it is to be employed; for Aſh has the Advantage of being light, but the Oak is vaſtly ſtronger; ſo that when the Work will be very hard, the Oak in Spite of its Weight, is preferable. As to its Breadth and Thickneſs, they may alſo vary according to the Soil that is to be tilled; but for moderate Ground, the Beam at the firſt Coulter Hole ſhould be five Inches deep and four broad.

Giving this as a middling Proportion, the Size of the other Parts may be as follows. The fore Sheat, commonly called ſimply the Sheat, ſhould be ſeven Inches broad; the Retch upon it muſt be of Iron, and its left Leg muſt ſtand foremoſt, that the Edge of its forepart, which is flat, may ſit cloſe to the Wood of the Sheat. The Uſe of this Retch is to hold the Sheat up to the Beam, which it does by Means of Nuts and Screws. Through the top Part of the Sheat there is alſo to be a Hole, which is to be a ſmall Part within the Beam, ſo that a Pin being driven into the Hole, draws up the Sheat very cloſe to the Beam. The Elevation of this Sheat is a very great Article in the Management of every Wheel Plow. If this make an Angle of more than five and forty Degrees with the plain Surface whereon the Plow ſtands, that Inſtrument will never go well. In the four coulter Plow it ought

to make an Angle of forty-two or forty-three Degrees only.

This Sort of Expreſſion will be very well underſtood by thoſe who are uſed to Mechanics; but for the Sake of the common Farmer, we ſhall ſay all that is meant by it is, that the Sheat is to be a little leſs raiſed in this than it is in a well going common Wheel Plow.

The Length of the Share from the Point to the Tail, ſhould be three Foot nine Inches. The Fin of the Share riſing ſlanting from the Point upwards. The Point of the Share ſhould be three Inches and a half long, flat underneath, and round at the Top, and this ſhould be of hard Steel underneath. The Edges of the Fin alſo ſhould be well ſteeled, and its Length proportion'd to the Nature of the Ground.

Behind the Fin is placed the Socket, into which the Bottom of the Sheat, before deſcribed, enters; and from the Tail of the Share is to riſe a ſmall Plate of Iron, this is to be well rivetted to the Share: by this the Tail of the Share is faſtened to the hinder Sheat. This faſtening is done by an Iron Pin, with a Screw at the End, to which a Nut is to be ſcrewed on the inner Side of the Sheat.

The Socket is to be a Mortiſe of about a Foot long, at the upper Part two Inches deep; and the fore End muſt not be perpendicular, but made ſlanting, conformable to the fore Part of the Sheat that enters into it. The upper Edge of the fore Part of the Mortiſe muſt bear againſt the Sheat; and if it be not quite ſo ſlanting as the Sheat, a little of the Wood is to be pared off at the Edge to make it fit.

The upper Side of the Share ſhould be perfectly ſtrait, but its Neck on the under Side ſhould ſtand a little hollow from the Ground. This Hollowneſs ſhould be about half an Inch in a common Plow, but in the four coulter'd Plow it ſhould not be above a Quarter of an Inch. So that the Share, when it is firſt made ſtanding upon its Bottom, bears upon the level Surface only in three Places: theſe are the Point, the Tail, and the Corner of the Fin. The Hollowneſs of the Fin muſt be greater in a ſtony Soil than in others.

The placing of the Share rightly upon the Sheat, is the moſt important, and the moſt difficult Part of the Plowright's Trade: on this depends the well going of the Plow, and for this Reaſon; as it is more important in the four coulter'd Plow than in any other, we adviſe the Farmer when he has made himſelf a Maſter by theſe Figures and Deſcriptions of the Form and Structure of this Plow, to take Care that he employ a ſkilful and an honeſt Workman; and if he do not find the Plow go well when made, to look there for the Occaſion of the Fault, for in that part is generally the Seat of it.

The Groundwriſt is to be of Iron, its Length muſt be two Foot five Inches, its Breadth at the longeſt End four Inches, and it is to go ſomewhat ſmaller all the Way. Its Thickneſs in general is to be three eighths of an Inch; but at the ſmaller End it is to be much thinner, that it may be capable of bending ſo, that it can be brought cloſe to the Share.

At the ſmaller End of the Groundwriſt are to be four Holes, through one of which there goes a Nail that faſtens the Groundwriſt to the Sheat. This paſſes through a long Hole which is made in the Side of the Socket of the Share. The Space between the Outſide of the Groundwriſt, to the Outſide of the Share, is eleven Inches and a half, and this is the Width of the lower Part of the Plow-tail at the Ground: at the upper Side of the broad End of the Groundwriſt there are alſo ſeveral Holes by which it is nailed to the lower Part of the Drock, this is long, narrow, and has three Holes for the Reception of its Faſtenings.

The Earth Board has a riſing near its End, which takes hold of the End of the Sheat to faſten it the more firmly; and near that are two Holes by which it is fix'd to the Sheat; at the other End alſo there is a Hole by which it is faſten'd to the Drock.

The Pin which faſtens the Earth Board to the Drock, is to be thicker in the Middle than at the End, and this prevents the Earth Board from coming near the Drock. By Means of this Pin the Earth Board is alſo ſet at a greater or ſmaller Diſtance from the Drock, as there is Occaſion ſometimes to throw off the Furrow farther from the Plow than at others. It always ſtands a good deal farther out on the Right Hand than the Groundwriſt, and this is one Reaſon why the Drock is made crooked; bending outwards in that Part.

The long Handle of the Plow is to be five Foot four Inches in length, and four Inches broad in the wideſt Part. It is to have Holes in its lower Part for pinning it to the Sheat, and another near its upper End by which it is faſten'd to the Drock.

The Length of the ſhort Handle is three Foot nine Inches, and it is to have two Holes, both toward its lower End: by the upper Hole it is pinned to the hinder Sheat, and by the lower to the Top of the fore Sheat above the Beam of the Plow.

We come now to deſcribe the placing of the four Coulters in the Beam of this Plow, contrived for their Reception; this is the moſt important Article of all: and the greateſt Point to be obtained is, that the four imaginary Planes, deſcribed by the Edges of the four Coulters, as the Plow moves forwards, be all parallel or nearly ſo, for if this be not regarded, they will not enter the Ground together.

To make ſure of this important Point, the Holes for the Coulters muſt be made in the Beam of the Plow in the following Manner. The firſt Coulter is to be placed as already directed, the ſecond Coulter Hole is to be made two Inches and a half more on the Right Hand than the firſt: the third two Inches and a half more on the Right Hand than the ſecond; and the fourth two Inches and a half more on the Right Hand than the third. This will place the four Coulters conformable to the four Cuts they are to make in a ten Inch Furrow.

Now no Beam of a Plow is broad enough to hold theſe Holes in this Direction, and for that Reaſon a Piece of Wood is added to the Beam of the four coulter'd Plow to give Space for it. This Piece is to be very well faſten'd to the

Beam, and the ſecond Hole is to be made, as will be ſeen, according to the Diſtance, partly in the Piece, and partly in the Beam; and the others will be all made entirely in the Piece. The Piece is beſt faſten'd by three good Screws with their Nuts, and its Place is on the Right Side of the Beam. The Diſtance of each Hole to the Right of the laſt, muſt be meaſured from the Middle of one Hole to the Middle of the other.

The fore Part of every Hole muſt incline a little to the Left, ſo that the Backs of the Coulters may not bear againſt the Left Side of the Inciſions made by the Edges. Each Hole is to be a Mortiſe of an Inch and Quarter wide, with its two oppoſite Sides parallel from Top to Bottom. The Length at the Top is three Inches and a half, and at the Bottom three Inches: and the Back of each is not perpendicular but ſlanting, and makes the Coulter ſtand ſlanting. It is fixed in this Mortiſe by a Pole Wedge in the ſame Manner as the Coulter is in other Plows.

The Coulter is a Kind of Iron Knife, conſiſting of two Parts; a Handle, and Blade; the latter having an Edge. The Length of the Coulter is to be two Foot eight Inches, but it will ſhorten in wearing; the Blade is to be ſixteen Inches long, with its Edge running all the Way along it; the Handle is to be of the ſame Length. This is ſo long that it will at firſt very well ſtand up above the Beam, but it muſt be driven down lower and lower, as the Point ſhortens by wearing. The Handle is to be an Inch and ſeven-eighths broad, and ſeven-eighths of an Inch thick throughout.

The firſt Coulter in all Plows ſhould be ſo placed, that its Back ſhould bear againſt the Back of the Hole; its Right Side above to bear againſt the upper Edge of the Hole, and its Left Side to bear againſt the lower Edge: and for this Reaſon there always are required at leaſt three Wedges to hold a Coulter in its Place. The Pole Wedge ſtands before it, the other two, one on the Left Side above, and the other on the Right Side underneath: and the Hole muſt be ſo made, that the Coulter ſtanding thus acroſs it, its Point may incline two Inches and a half or more toward the Left than the Point of the Share if it were driven down as low as it: but it ſhould never be ſo low in any Plow whatſoever. As to its bearing forwards, the Point of the Coulter ſhould never be before the Middle of the Point of the Share. It muſt be ſet obliquely with Reſpect to the Share, as we have diſpoſed it in the Figure of the Wheel Plow, and it muſt never be ſet much more ſlanting; for if it ſhould, it would have greater Force to raiſe up the Pole Wedge, and would be continually getting looſe.

In the four coulter'd Plow, the three other Coulters are to ſtand in the ſame Poſture with this in Reſpect of the Inclination of their Points to the Left: this is a great Advantage to them; for by that Means when the Fin is raiſed up by turning the Handles toward the Left, their Points do not riſe out of the Ground on the Right Hand as they otherwiſe would. With Reſpect to their pointing forwards, Experience ſhews, that every one of the three ſhould be ſet a little more perpendicular than the next behind it; ſo that the fourth Coulter will ſtand neareſt to perpendicular of any of them.

None of theſe Coulters ought to deſcend ſo low as the Bottom of the Share, unleſs when the Plowing is very ſhallow. It is always ſufficient that they cut through the Turf, however deep the Plow go into the Ground.

When the Plowing is to be very ſhallow, the Fin of the Share ſhould be broad enough to cut off the fourth Piece of the Furrow.

The Nut which ſerves for faſtening the Piece to the Beam of the Plow, ſhould have two oppoſite Corners turned up, by which it may be driven round with a Hammer. This has ſo great a Force, that three of theſe will hold the Beam and the Piece as firmly together, as if they were one Bit of Wood. In dry Weather the Wood will ſhrink, and then the Nuts are to be driven farther on. The ſame Caution muſt be obſerved in other Parts of the Plow. Between the Nut and the Wood there ſhould be a thin Piece of Iron by way of Bolſter; this prevents the Nut from wearing into the Wood, it muſt be ſomething larger than the Nut, and of the Thickneſs of a Shilling. Some uſe a Piece of Leather, but when the Nut is to be often ſcrew'd, Iron is much better.

There muſt alſo be Iron Plates upon all the Coulter Holes both above and below. Theſe muſt be nailed on with Nails made for that Purpoſe.

Inſtead of a Collar moving round the Beam, 'tis much better to have a ſquare one with an open End, which ſhall faſten to it by a Couple of Crooks. Theſe muſt turn upwards, that they may not lay hold of any Thing that ſhall be turned up under the Plow; the Front or Cloſe-end of this Collar is to be a ſtrong Iron Bar, with ſeveral Notches. Two Pins are to be driven into the Beam of the Plow, juſt behind the ſecond Coulter Hole, one on each Side: and there is to be another Crook, called a (C) from its Shape, which is to go over the cloſe End of the Collar. Each End of this is a Hook, and one of theſe lays hold of the croſs Bar of the Collar, going into one of its Notches; and to the other is fixed a Link, which holds the Tow Chain to the Collar.

The Uſe of thoſe Notches, and this fix'd Poſition of the Collar is this; that as the Share wears at the Point, it always inclines a little to the Right; and this is remedy'd by removing the Crook into another Notch of the croſs Bar of the Collar, ſo that the Point of the Share is thus always kept in a proper Direction. The Length of each Side Bar of the Collar ſhould be a Foot.

We have ſhewn that the Tow Chain of the Plow is faſten'd within the Box by a Staff paſs'd through its firſt Link, as the Hook of the Collar holds its laſt. This Stake is commonly nailed to prevent its flying out of its Place. And when the Plow is to be drawn a little nearer the Crow Staves, the Method is to take in another Link of this Chain, paſſing through the Stake, and faſtening it as before: or it may be done better by taking hold of the Crook of the Collar, with a ſecond or third Link of the Chain.

This

This ſhortening of the Chain always draws the Point of the Share a little to the Left.

For drawing of the Plow there is faſten'd to the Box an Iron Machine, called the Wilds; this is very like the ſquare Collar, only its Legs are longer. The croſs Bar at the Top is notched as that of the ſquare Collar, but only one Leg of the Wilds is fixed to this ſquare Bar in the making; the other Leg is looſe, and has a Loop through which the other End of the croſs Bar is put, ſo that it is fixed on at Pleaſure. Both theſe Legs of the Wilds paſs through the Box of the Plow, and are faſten'd in behind it by a Couple of hooked Pins made for that Purpoſe. The Holes cut thro' the Box for letting theſe Legs paſs, are to be made ſlanting upwards, ſo that the fore Part of the Wilds may be higher than the hinder; otherwiſe the upper End of the Crow Staves will lean quite back when the Plow is drawn. The Uſe of the Notches in the Bar of the Wilds, is to give the Plow a broader or a narrower Furrow. A double Crook with a Link is fixed to this Bar, and by this the Horſes draw. If theſe Cattle are tall, the Traces muſt be long, elſe they will be apt to raiſe the Wheels off the Ground, and overturn the Plow.

The Legs of the Wilds ſhould be eight Inches and a half aſunder, and their Length nineteen Inches: the Links are to be ſix Inches and a half long. They are to be put into two Notches diſtant from one another, or elſe one Wheel of the Plow will advance before the other. When they are moved to the Notches on the Right Hand, it brings the Wheels toward the Left Hand, which gives the greater Furrow; and, on the contrary, when they are moved on the Notches on the Left Hand, it gives the Plow a leſs Furrow, by bringing the Wheels toward the Right.

The Height of the Wheels we have mention'd already, as alſo the proper Method of making one of them higher than the other: their Diſtance ſhould be two Foot five Inches and a half, as ſet from one another on the Ground. The Crow Staves ſhould be one Foot eleven Inches high from the Box of the Plow to the Gallows that goes acroſs them: theſe are to ſtand upright upon the Box, and they ſhould be ten Inches and a half aſunder.

The Pillow which croſſes the Staves below the Gallows, is to be pinned up at its End by two ſmall Iron Pins, and it is convenient to keep theſe chained to it, that if they chance to drop, they may not be loſt.

The Height from the Ground to the Hole in the Box where the Tow Chain paſſes through, is to be thirteen Inches. This brings it to two Inches below the Holes of the Wilds, on the hinder Side of the Box.

The Height of the Plow at the Place where the other End of the Tow Chain is faſten'd to the Beam, ſhould be twenty Inches from the level Ground; and about the Middle of the Tow Chain there ſhould be a Swivel, that one End of the Chain may turn without the other.

This is the Conſtruction of the four coulter'd Plow; and as it is founded upon the two wheeled Plow improved to the greateſt Perfection, the Parts of that Plow can never be ſo well underſtood as in the Deſcription here given for their perfect and exact Conſtruction. 'Tis therefore we have taken this Opportunity of entering into the full and exact Detail of them; and we have formed our Figures of them relatively thereto. It is very neceſſary that he who would undertake to make, or to give Orders for the making of a four coulter'd Plow, ſhould firſt thoroughly underſtand the Conſtruction, Parts, and Compoſition of a perfect one with a ſingle Coulter; and we have by this Means avoided the Repetition of a long and dry Detail of the Parts.

We have before ſhewn what was the firſt Conſtruction of the Wheel Plow, which was a vaſt Improvement upon the Inſtruments in Huſbandry of that Time; and we have here explained its farther Advances toward that Perfection, which it may be juſtly ſaid to have attained in the four coulter'd Kind.

When the four coulter'd Plow is made, let it be try'd with the ſingle Coulter before the others are put on. There may be a Fault in the Work that cannot be diſcover'd, even by a judicious Eye, till it is try'd; and this may prevent its going as it ought. That Plow which will not go well with one Coulter, certainly would not with four; but it would be very unjuſt to charge upon the Number of the Coulters, what is really the Fault of ſome Part of the Structure of the Inſtrument itſelf, independent of that Addition.

If the Plow goes well with one Coulter, then put in the other three; there is not much Fear but it will alſo go well with them. If it do not, then let the Poſition of the three additional Coulters be examin'd; and let it be ſeen in what that differs from the Rule, laid down here for that Purpoſe. That it differs in ſomething need not be doubted; for of a Certainty, if they be rightly diſpoſed according to theſe Directions, the Plow will go well.

To know whether a Plow goes well, examine the Furrow: if that be of an equal Depth on the Right Hand and on the Left; and if the Plow turns it off fairly, it is right. If in the going of the Plow, the Tail of the Share, and the Bottom of the Drock bear againſt the Bottom of the Furrow; and if it goes eaſy in the Hand of the Holder, without preſſing one Arm more than the other, the Farmer may be aſſured it is a good one. Such a Plow will go with four Coulters as well as one.

CHAP. XXIX.

Of the Management of a Plow in working.

WHEN the Farmer has got his Plow well made, let him ſee that he keep it in Order; and that he employ a Man in the working, who is able to manage it as he ought, and who has Honeſty enough to take the neceſſary Care and Pains. The Farmer depends more upon the Integrity and Knowledge of his Plowman, than on the Qualities of any other Servant whatſoever.

The Handles of the Plow being made of that Length

Length we have ordered in the laſt Chapter, are very uſeful for the proper guiding of that Inſtrument; but often the Plowman will cut them ſhorter to favour his Idleneſs. When they are ſhortened, he can bear his whole Weight upon them, and in a Manner ride inſtead of walking. If he ſhould play this idle Trick with long Handles, his Weight would tilt up the fore End of the Beam, and raiſe the Share out of the Ground. The keeping the Arms long therefore prevents this negligent Trick, and at the ſame Time gives him an Opportunity of managing the Plow to the greateſt Advantage.

An awkward Plowman will be continually over-ſetting the two wheeled Plow; but a careful Perſon who is uſed to the Management of it, hardly ever meets with ſuch an Accident. The great Danger of over-turning is, at the going out at the Land's End, from one Furrow to another. But the ſkilful Plowman lifts his Plow a little round, and then holds up the Crow Staves with the End of the Beam, by preſſing his Hand hard againſt the Handle, while the Plow lies down on one Side, till the Horſes, the Wheels, and the Body of the Plow come nearly to a Line in the Beginning of the Furrow; and then he lifts up the Plow and goes on.

Theſe little Contrivances are exceedingly uſeful. They are more eaſily ſeen in the Practice, than taught by Words; but what is here ſaid may ſerve to let the Farmer know when his Plowman manages his Buſineſs right, and when he does not; and may aſſiſt him in the giving one that is willing Directions.

In the four coultered Plow there is another Inconvenience very likely to happen, but very eaſily remedy'd: this is, that ſometimes the firſt or left Furrow is apt to come through betwixt the firſt Coulter and the Sheat, and in this Caſe it falls upon the Left Hand Side of the Plow.

This, though not of the Conſequence of many other Faults, yet is worth preventing, and the more as the Remedy is eaſy. To this Purpoſe let the ſecond Coulter ſtand a little higher than the third; and then the ſecond Furrow, holding the firſt at its Bottom, will carry it over together with itſelf, and throw it on the Right Side of the Earth Board.

Let me give the Farmer one Caution farther in this Matter; which is, that in this placing the Coulter, he never ſets it ſo high that it does not cut the Turf through. As to the firſt Coulter, though it ſhould cut but an Inch or two within the Ground, the Share will break off the firſt Furrow in raiſing it up.

If in the Plowing with this four coultered Kind, the Coulters become clogged and loaded with Pieces of the Turf, a Boy ſhould go by the Side with a forked Stick to clean them off from Time to Time, which is done very eaſily.

The Coulters being diſpoſed exactly as we have deſcribed, will have more Space between them above than below; ſo that this clogging will not happen often, and when it does, the Cleaning is eaſily performed. The Farmer may always know when he ſhall have Occaſion for a Boy to follow for this Purpoſe, becauſe it riſes not from the Fault of the Plow, but the Nature of the Ground. This Plow in clear Ground goes as free and clean as any; but when there is a great Quantity of Couch Graſs on the Land, its Roots hold the Turf together in ſuch a Manner, that it riſes in Pieces, and hangs between. This is the only Occaſion on which there is a Need of ſuch Aſſiſtance; but if it be not taken Care of, the Load of clogging Matter will fill the Spaces between the Coulters, and raiſe up the Plow out of its Work.

In the common two Wheel Plow there is a very great Inconvenience too frequent, and of very bad Conſequence; this is, the leaving a great Part of the Land unturned from the Shear's Point going too much to the Left. The Conſequence of this is, that the Work is done irregularly, and often a great Part of the Ground which is covered by the broken Earth, is whole and untouched, and the Weeds are found afterwards growing upon it. This is a great Fault: it defrauds the Farmer of ſo much of the Buſineſs he engaged ſhould be done; and there is nothing he ought to look into ſo carefully.

Sometimes he will find it happen from the Imperfection of the Plow itſelf, and then he is to apply to the Maker. The well going of a Plow principally depends in the placing of the Share rightly upon the Sheat; and in this Caſe the Remedy muſt be by an Amendment in that Article. This is the niceſt and moſt difficult Part of the Plowright's Buſineſs, and is what the Farmer is moſt concerned of all other to ſee done well: it matters not that the Maker can tell him, or ſhew him it is right as it ſtands upon the Ground, let him try it in ſome Work, and never be ſatisfied with it till it anſwers its Expectation.

This Fault laſt named, though it ſometimes be owing to the Make of the Plow, yet may alſo ariſe only from the Folly of the Plowman's ſetting it wrong: therefore this ſhould be tried firſt. His Fault is the ſetting it ſo that the Point of the Share turns too much to the Left: in this Caſe it will always cut croſly, and leave a Part of the Ground untouched, tho' covered by that which has been cut, and is thrown over it.

There is no Part of his Buſineſs which the Farmer is more under a Neceſſity of following with his own Eye than this. His Intereſt is engaged in the well executing of it, though the Servants is not. It is eaſy to plow too ſhallow, or too deep. Where there is a full Soil, the deeper the Plow cuts the better; but where the Soil is ſhallow, and the Bottom bad, let there be great Care taken that the Clay or whatever other bad Matter it be, ſhall not be turned up with the Soil. He ſhould himſelf overſee this that his Plowing may give him all the Advantage, and avoid all the Diſadvantage there is in the Condition and Nature of the Ground.

Some Choice is to be made in regard to the Situation, in the Manner, and Courſe of the Work. When a Land lies upon the Deſcent of a Hill, let it never be plowed ſtrait up and down, but croſswiſe. This has a double Advantage: for the Horſes are not tired, as they would be with going ſtrait up and down, and the Land alſo will fare a great deal the better.

These Grounds that lie upon the Sides of Hills are generally poorer than others, and they require a great deal of Manure, and that is soon washed away from them. We have observed in another Place, that the Reason of the Manure lasting but a little Time on such Lands is, that it is wash'd down by the Rains, together with the finest Part of their Mould, and runs to the low Grounds which are proportionably enrich'd as these are impoverished by this natural Cause.

Now as the Farmer would wish that these Grounds should retain all the Richness that he is able to give them, as well as all they have of their own, so far as that may be brought about by his Assistance, there is no Method by which he can better stop the Progress of this Mischief which exhausts them, or keep their rich Parts in them better than by this Method of Cross Plowing.

CHAP. XXX.

Of the Advantage of Plowing cross-wise on hilly Grounds.

WE shall see in this Article the Use and Necessity of the Husbandman's understanding the Reasons of what he is advis'd to do. He has been told that the Misfortune of all Lands lying upon a Descent is, that their rich Particles are dislodged by the Rains, and carry'd away with them. That this is the Fact is plain, for the Water runs off foul and thick. What makes it foul but the Matter it takes up from the Land? nothing else can, for it falls from the Clouds clear. We see that it carries off somewhat from the Land, and what should that be but the lightest and finest Part. This is what it can the most easily dislodge, or wash up out of the rest; and this is what it can hold up longest. This we know is the finest Part of the Soil, whether owing to Nature or to Art, and is what should supply the Plants with Nourishment. It is the lightest of the vegetable Mould, and the finest Part of the Manure.

The Time when this can be dislodged by the Rains most effectually, is when the Earth has been most lately plowed; and in the Method of plowing strait up and down, which is now very common in many Places, and especially where the Descent is small, what does the Farmer do but cut so many Trenches, for the giving it a clear and speedy Passage.

This is a terrible Fault. It must be his Business to stop and detain this Rain Water, which has taken up a great Part of the Riches of his Soil; but in this Way of working he assists its speedy running off. It is his Misfortune that the Rains have dislodged this fine Earth from among the rest, and yet he not only lets it go off with it freely, but in the very plowing of his Ground cuts it a Multitude of Passages. When the Rain has taken up this fine and valuable Part of the Soil, it must be his Business to stop and detain it as much as possible, because the longer it stays the more it settles, and leaves more of this fine Matter upon the Land.

We see what it is that is taken up by the Rains running down plowed Fields that have a Descent; let us examine what becomes of it. 'Tis wash'd out of the Field, and according to the Course of the Descent, and the Nature of the Fence, it runs to another Man's Ground, or to some other Ground of the Farmer's own which does not want it; or it stops in the Ditch of the Fence and there lodges, feeding an extravagant Abundance of Weeds, with what should have supported the Crop.

This is the Consequence of plowing strait up and down in hilly Grounds, which is yet practised in some Places, even in the most steep; and almost every where when the Descent is small. Where they have got into the better Methods of plowing cross-wise, it has been on Account of sparing the Labour of their Horses, more than with any other View: but we have shewn them here, and shall shew them more largely, that there is a much greater and more important Reason for cross-plowing in all Lands that have any Descent.

The Rains will fall equally upon the Ground, whatever be the Manner of dressing it, but their Effect will be very different according to that Method. Let us suppose an upland Field of a light Soil (for these are most hurt by this Effect of the Rains) plow'd cross-wise, and well wash'd by a Shower. What is the Consequence. The Water is thick and yellow, being full of the Richness of the Soil, and it is for running down according to its natural Course. It is stop'd at every Furrow. Very little of it gets out of the Field. And there is this double Advantage, that the whole Soil is better and more perfectly moistened by the Rain, than it could have been any other Way; and that the fine and rich Part which has been wash'd from the Surface, penetrating with the Water, becomes mix'd with every Part of the Mould.

This is an Advantage of the greatest Kind, and this singly, without any other Consideration, ought to influence the prudent Farmer never to plow any other Way than cross-wise, upon a Descent, whatever his Fathers have done before him in the same Ground; or whatever his Neighbours may be doing then upon Lands of a like Kind and Situation. Reason should get the better of Prejudice every where; though nothing should get the better of Experience. The Farmer must have seen in the Course of this Work, that Reason never contradicts Experience: indeed it is impossible it should: where the Fact is rightly stated, and the Reasoning is just, they always enforce and confirm one another.

CHAP. XXXI.

Of laying Land in Ridges.

WE have seen that a great Article in the rendering of Land fertile, is the breaking and dividing it into small Particles, whether this be done mechanically by the Plow, or by Fermentation given to it by Manures; that this breaking of the Soil into small Particles is essential

tial to the free Growth of Plants is very plain, becauſe it is from the ſmalleſt Particles of this Matter that they are nouriſhed, and the breaking of the Land in this Manner is the only Method of giving the Roots a free Paſſage between them, in their Search of this Nouriſhment.

On this, which is evident from the preceding Facts and Reaſonings, depends the famous Syſtem of Horſehoeing Huſbandry. But beſide theſe two Articles, of Liberty of ſpreading the Roots, and a proper Quantity of Nouriſhment, there are two other, without which Plants cannot thrive, theſe are a due Degree of Heat and Moiſture.

Corn, and the other common Produce of our plowed Land, demands a moderate Degree of each of theſe, and the Farmer is to guide his Practice throughout in ſuch Manner, as to give them a Supply without giving them Abundance. It will be aſk'd, can the Farmer cauſe Sunſhine, or can he call down Rain. Neither: nor do we expect Impoſſibilities of him, nothing is more eaſy than what we require him to do, and the Effect ſhews that it will ſucceed. We have ſhewn in our third Book, the Way by which he may defend his Lands from Cold by Fences, and in the Beginning of the preſent, in what Manner he may keep his Ground moiſt by Tillage, theſe Things therefore are in his Power; however little they may ſeem ſo to thoſe not acquainted with the Practices of Huſbandry, their Reaſons, and their Effects.

But as he is to communicate to his Crop all good, ſo far as he is able, ſo he is to defend it from all ill: and as in the preceeding Chapters we have ſhewn how he may give the Advantage, it remains that we ſhew how he may prevent the Hurt.

Now one of the greateſt Misfortunes that can attend a Crop, is too much Wet. This ſometimes happens from the Particularity of a Seaſon; but oftner from the Nature of the Land. When the firſt is the Caſe, the Farmer's Care muſt be to find Methods of carrying the Wet off; when the latter, he muſt employ all his Care to provide againſt it. Land that is too wet will never produce Corn well, and to prevent the Miſchief attending this Condition of the Ground, has been invented the Practice of which we treat in this Chapter, the laying Land in Ridges.

This is a particular Sort of Tillage, and its Effect is greater than thoſe ſeem to underſtand who employ it. They uſe it only to keep their Lands from being too wet, but it has an Effect in regard to the Degree of Heat, not leſs than with Reſpect to that of Moiſture.

We ſhall ſee, upon examining this Practice and its Effects, how well Nature has taught People to uſe it. We ſee them in the moderate Soils that are frequent in BUCKINGHAMSHIRE, and elſewhere, frequently lay four Ridges together: in KENT they often lay ſix, and the lower Parts of ESSEX eight, and in HUNTINGDONSHIRE, upon their wet and ſtiff Clays, they ſow all upon broad Lands, raiſing the Middle of the Ridges in ſome Places two Foot and a half higher than the Side Furrows. This at once expoſes thoſe tough and clammy Soils to the Sun better than any other Method, and drains them of the abundant Wet.

We have ſeen that Calcination by Fire reduces Clay to a good and rich Mould, and that the draining it of abundant Moiſture always abates its Toughneſs. Now theſe are the Effects of dreſſing ſuch Land in this Manner: and in order to have the full Effect of the Practice, let the Farmer take Care to make the Ridges run Eaſt and Weſt, where the Situation will allow it, becauſe in this Caſe the Sun gets at every Part of them the better; and in order to promote farther the other good Effect of draining, let him take Care always to keep the Furrows that are left, open and clean ſcowered. By this Means they will ſerve to carry off the abundant Moiſture; and to give it a free Diſcharge from the Ground, Drains muſt be made in the loweſt Places, that may run well into one another. This is ſo eſſential a Practice, that when the Plow will not make them deep enough, it ſhould be done by hand with the Spade; and the Earth that is taken out ſhould, in this Caſe, be carry'd to a Diſtance, that it may not be trampled in again.

The chief Deſign of laying Land in Ridges is draining of it, and making the Corn grow properly dry: but we ſee that by a proper Management it may be made to extend its Benefits farther. In this Caſe, of a clayey Soil laid in Ridges open to the Eaſt and Weſt, where the Situation is ſuch as to allow it without other Damage, the Sun acts in a double Way upon the Soil, not only giving it Warmth, when the abundant cold Moiſture is taken away, but by a gentle Calcination of the Surface, it reduces that ſuperficial Part to a State of greater Perfection, and to a Kind of Manure for the reſt.

We have ſeen that the Effect of the Sun and Air is a ſlow Calcination; that this does gradually what a Fire does haſtily, this has been ſhewn in its Effects on Shells, which whither they remain on the Sea Shore, or are ſcatter'd on Lands as a Manure, become, in time, white and briſtle, and in all Reſpects reſemble ſuch as have been calcin'd in a Fire.

The natural Defects of many Lands, otherwiſe uſeful and good, are a too great Degree of Moiſture, and a Defect of Heat. The latter naturally ariſes from the former, for a Quantity of Water detained among Clay, or any other tough Earth, becomes cold, and chills the Plants that are laid upon it. The great Remedy, in this Caſe, is the laying the Land in Ridges; and that the careful Huſbandman may be ſure to know when this is requir'd, as well as how to do it, we ſhall give him the following Hints.

In many Places the Abundance of Moiſture, and the Coldneſs of the Soil, are very obvious to the Eye: the Land is clammy and wet the greateſt Part of the Year, and he will know of himſelf that this is not a Condition in which it will bear Crops to any Advantage. This obvious and plain Diſcovery of the Fault is moſt conſtant where the Occaſion of it lies high, where the Clay makes the whole Soil. But the ſame Fault may be in the Ground where the Occaſion of it lies ſomewhat deeper, and though it is not perceiv'd by the Eye, the Effects may be found the ſame. Thus when a Land has a thin, light, and looſe Soil at the Top, and a tough Clay at a ſmall

Depth under it, the Wet will run through the light Earth preſently; but it will lodge on the Clay underneath for a Continuance. This is a very deceitful Kind of Land. It will look dry, when it is, in reality, very wet below; and this in the very Place where the Roots find their Nouriſhment, for they do not ſpread much juſt at the Surface, but moſtly at ſome ſuch little Depth below.

As the other wet Lands ſhew themſelves to the Eye in their own Condition, the Fault of theſe is to be ſeen in the Growth of the Crop. When it is in a great Degree it diſcovers itſelf to the Senſes on every opening of the Ground, but even in a leſs it is capable of doing great Hurt, and it is then known by the Aſpect of the Corn or other Growths. If the Leaves look ſickly and yellow, if they droop, and the Stalk riſes ſlowly, we may be ſure this is the Fault of the Soil, and that it is owing to wet and cold: we may be certain that however dry and fair the Land may ſeem juſt on the Surface, it is wet at a ſmall Depth.

When the Cauſe of the Diſeaſe is known, the Remedy is eaſy, it is nothing more than this laying up the Land in Ridges. If the Deſcent of a Hill do not prevent, let theſe be open to the Sun, by being laid Eaſt and Weſt; and by this Means, while the Water is carry'd off by the Diſpoſition of the Ground, the Sun will calcine, and every Day improve the clayey Matter that lies on the Surface, from the Effect of plowing.

The Water naturally, in this Caſe, runs off the Ridges into the Furrows, and is thence, as before directed, to be carry'd by proper Drains out of the Land, to ſome River or other Conveyance.

CHAP. XXXII.

Of the wet Land on Hills.

WE have ſhewn that the very Intent of laying Land in Ridges, is to drain it of abundant Wet, the Conſequence of which is Cold: and as there are more Kind of Lands than one that are apt to be wet, and thoſe, according to their Differences of Condition and Situation, may require ſome Variation in the Manner of applying the Remedy, it will be uſeful to conſider them ſeparately.

The two principal Kinds of Land that are liable to be chill'd by Wet, are thoſe on Hills where there is a Bed of Clay under the Mould; and thoſe in level Grounds, which conſiſt of a very deep and very ſtiff Soil. The former Kind are to be treated of in this Chapter.

The Occaſion of the Miſchief in theſe is very obvious, the Rains fall upon this Ground, and ſoaking through the Mould, are detain'd by the Clay. They cannot enter the Clay, and therefore they ſpread themſelves among the Mould above; and the Mould below ſtopping it in its Deſcent, and more Water falling above, the whole approaches to the Nature of a Bog; the Ground being ſoft, pappy, and rais'd above the natural Level by the Water ſpread among it.

When this is the Caſe in a very great Degree, no Method of plowing can be ſufficiently effectual to remedy it. In this Caſe Trenches muſt be cut a-croſs with a Deſcent, to carry the Water off. And they may be fill'd up with rough Stones, and cover'd over with Earth again, ſo that all may be wrought as a level Surface: Reaſon points out this Remedy, but it is often too expenſive, and ſuch Lands, when too wet and too difficult of Remedy, are to be neglected: we therefore have named theſe only to ſhew, that they are not to be attempted by ridging; for nothing diſheartens a Huſbandman ſo much as undertaking what he afterwards finds cannot be done.

When the Wet is in a conſiderably large Degree, it may be diſcharg'd by laying the Land properly in Ridges, though not where it is thus very abundant: therefore let the Farmer firſt examine carefully whether the State of the Ground will or will not admit a Cure; if he thinks it will, this is the Manner in which he is to ſet about it.

Let him plow the Land in Ridges, almoſt croſs-wiſe of the Hill, but a little oblique or ſlanting: for if they be perfectly carry'd a-croſs, or quite ſtrait down, they will neither Way do. When they are thus carried croſs-wiſe, but a little diagonally, their parting Furrows lying open, will each ſerve as a Drain to the Ridge next below it: for when the Plow has made the Bottom of theſe nearly horizontal Furrows a few Inches deeper than the Surface of the Clay, the Water will naturally and ſecurely run to their Ends, without riſing into the Mould, provided no Part of the Furrows be lower than their Ends.

We have ſaid theſe parting Furrows and their Ridges, ſhould always be made a little obliquely; and this Obliquity or ſlanting ſhould be more or leſs, according to the Form and Declivity of the Hill.

We are to conſider that there are two Ways in which Water that falls upon an Hill runs off. The one is on the Surface, and the other is between the Mould that makes the Soil, and the Clay that makes the Bed under it. 'Tis this ſecond Courſe, or the running of the Water upon the Bed of Clay, and under the Mould, that we are to conſider on theſe Occaſions; for on that depends the Damage we propoſe to rectify. This is the Source of what we have directed, as to the Diſpoſition of the Ridges; and it will be found, on the moſt careful Examination, that as only this Method of ridging could keep that Part of the Soil dry, ſo there is no Direction in which they could run, that will ſo well ſecure the Advantage, as the carrying them with this Slant croſs-wiſe of the Hill.

In this Caſe the Conſideration of laying the Ridges Eaſt and Weſt, muſt give Way to this croſs Direction with reſpect to the Deſcent of the Hill. We have mentioned, under that Head, that there were Exceptions; this is the principal; and in this, as in all other Caſes, the greater Convenience is to be conſulted, and the leſſer is to give Place to it.

The Farmer who ſhall make himſelf perfect Maſter of his Buſineſs, will often find two Things would be right, both of which together are impracticable:

practicable: he muſt, in this Caſe, content himſelf with taking the beſt.

The Way of working on this Occaſion is to plow the Ridges in Paces, without throwing any Earth into the Trenches. In this Caſe the Ridges will be plain at the Top; and the Rain Water will ſpeedily run downward to the next Trench, and thence to the head Land, and ſo out of the Field.

Theſe are eaſy and plain Directions, and the Succeſs of them is certain; it not only is plain to Reaſon, but is vouched by Experience; and yet a great deal of Land that might be ſaved by it, is left to produce little or nothing by the common Treatment.

CHAP. XXXIII.

Of the wet Land that lies level.

THIS is the ſecond Kind of Land that is liable to be wet and cold, and that may be greatly mended by the Tillage in Ridges. Sometimes there are Springs on the Hills that add to the Quantity of Water which they have from Rains, and this makes the Cure more difficult: in theſe deep, wet, and ſtiff Soils that lie on a level, the Cauſe is always to be found in the Water that falls by Rain alone. But this will ſometimes put the Land into as bad a Condition as if there were Springs in many Places.

When a deep ſtiff Soil lies flat, and is plow'd ſometimes one Way, and ſometimes another by croſs Plowing, it will hold Water a long Time. By that Misfortune the Plow is kept out two or three Weeks longer than if it were in round Ridges. Sometimes its Flatneſs keeps it from drying till the Seaſon of Plowing and Sowing too are loſt.

The Farmers are backward in Plowing the hilly wet Grounds in Ridges, and more in this. They ſay it prevents the Benefit of croſs Plowing, which they count as a great Advantage, and they think they loſe a Part of their Ground by the open Furrows, which they otherwiſe fill up with Harrows. But theſe are Miſtakes and Prejudices, of which it becomes us to ſet the practical Farmer right; for on ſuch Notions which he receives upon Credit, without being at the Pains of examining whether they be true or falſe, depend the greateſt Part of his Diſappointments and Loſſes. Croſs Plowing is oftener a Hurt than a Benefit to Land: this is certain, and any one who is accuſtomed to Farming, and will examine what he from Time to Time ſees, inſtead of taking all Things upon Truſt, will find it ſo in Experience. This therefore is an Objection ariſing only from Prejudice in Favour of common Practice, and common Opinion: the other is entirely an Error; for, inſtead of loſing any Ground by Ridges, it is poſſible to gain ſome. In the moſt ſimple and common Practice none is loſt; and managing wiſely and properly, much may be gained.

Ground is gained for the Farmer's Purpoſe when its Surface is increaſed, and is capable of bearing more Corn; and this is plainly practicable in the Plowing in Ridges. If in this Cuſtom of Plowing we allow two Foot in ſixteen for an empty Furrow, ſtill the Difference of Surface between the reſt as it lay flat, and as it is plowed into Ridges, is much greater in his Favour than this Proportion is in Loſs of Quantity. All the Surface thus raiſed in Ridges is capable of bearing Corn, and therefore it is ſo much Ground gained to the Huſbandman.

This is the plain and abſolute Fact; and this is all that it concerns the Farmer to know. Many Arguments have been raiſed againſt it, but they are frivolous or falſe. We name them only that the Reader uſed to ſee Things thus canvaſſed, may not think we overlooked them. To the practical Huſbandman they are of no Importance, for they have no real Weight; and to the Curious it may be enough to ſay, that the Doctrine of the perpendicular Growth of Plants, on which all their Cavils are founded, is in itſelf erroneous and falſe.

It is certain the Surface of a Field meaſures more in Quantity when in Ridges than when flat; and it is equally certain that all its Surface, the empty Furrows excepted, is capable of bearing Corn. This is a ſhort State of the Caſe. Theſe empty Furrows have been taken into the Computation, and the Difference is in Favour of the Land in Ridges. No Sophiſtry can get the better of ſo plain a Fact; and it is upon this Fact, and the evident Advantage that wet and cold Lands receive from this Kind of Tillage, that we recommend to the Farmer the Tilling his ſtiff, cold, moiſt, and flat Lands, in this Method of plowing in Ridges.

The Succeſs and Quantity of a Crop does not depend upon the Space there is for the Corn to ſtand in, but on the Quantity of Earth there is for its Roots to ſpread in for getting of Nouriſhment: now we have ſhewn that the Roots of Corn ſpread near the Surface, or at a ſmall Depth under it; and we find from this alone, that the Increaſe of the Surface of Ground in meaſure, is in Reality an Increaſe of it in Quantity, ſo far as the Growth of theſe Plants, whoſe Roots ſpread at a ſmall Depth under the Surface, are concerned.

The Increaſe of Ground therefore is a certain and a conſiderable Advantage obtained from the plowing in Ridges, but it is not the only Benefit attending that Method. Beſide the great Purpoſe which is anſwer'd by it in keeping the Land warm and dry, the Ridges are a Shelter for one another, and a Defence againſt cold Winds; and when the Field has been exhauſted by frequent ſowing, the Ridges may be made juſt where the Furrows were, and there will be all the Advantage of freſh Ground.

Having explained the Benefits of Ridges, and the Reaſons on which they are ſupported, we ſhall proceed to give the practical Farmer two or three Cautions about the making of them, that he may be able to do what we have adviſed to the beſt Advantage.

In a deep Soil let the Ridges be made narrower, and in the ſhallower let them be broader. Let him overlook the Work, and have a particular Regard upon deſcending or ſlanting Grounds, to the Direction and Courſe of the Furrows; and if he intend to follow the Horſe-

hoeing Method, which we ſhall deſcribe hereafter, and which in a moderate and proper Uſe, has great Advantages, he ſhould rather chuſe a Land that is dry in its own Nature, than one that wants this Aſſiſtance of being laid up in Ridges, for they are often an Interruption to that Practice.

The Furrows are to be deep or ſhallow, according to the Depth or Shallowneſs of the Soil. When theſe Lands are improved by this Method of laying them in Ridges, Wheat and Rye need not be ſown upon them ſo early as they are in their cold and wet natural State; but they muſt ſtill, with all this Improvement, be ſown earlier on them than on Lands that are naturally dry, and warm. For Summer Corn, on the contrary, the cold Land muſt be ſown laſt.

In many of the Weſtern Counties they ſow all their Barley with a broad Caſt upon broad Ridges; and in Kent and Essex they frequently ſow it on narrow Ridges like Wheat: in this Caſe there are to be two ſmall Harrows uſed, one of which is to take each Side of the Ridge, and this Method is then very ſucceſsful. They roll it with a Roller of a particular Structure, called a Belly Roll, that goes between the Ridges.

CHAP. XXXIV.

Of the Advantage of Tillage by the four coulter'd Plow.

WE have deſcribed in a preceding Chapter, the Make and Conſtruction of that excellent Inſtrument, the four coulter'd Plow, in ſo preciſe and punctual a Manner, that the careful Reader, altho' he have never ſeen one, cannot be at a Loſs to order the making of it; and having now treated ſo far of the Nature and Advantages of Plowing in general, we ſhall be underſtood with Eaſe in recounting the Benefits that attend this particular Method.

Nothing gives the Huſbandman more Trouble than the conquering a ſtrong Turf; and there is no Method whatſoever by which he can effect this ſo well, as by the four coulter'd Plow. The richeſt Land is ſubject moſt of all to this tough Head; and the deeper the Soil, the larger muſt neceſſarily be the Furrows; for if they be too ſmall, a great Part of the Mould will be left unmoved, and ſo loſt to the preſent Uſe of the Farmer. A narrow Furrow cannot be plowed deep, becauſe the Plow will continually ſlip out from the hard Land toward the Right Hand, unleſs the riſing Furrow be of ſufficient Weight to preſs the Plow toward the Left, and keep it in the Work. The deeper the Farmer goes, the greater Weight is required to preſs the Plow: ſo that the deeper the Land is into the larger Furrows it muſt be plow'd. If the Work be done with a common Plow of the very beſt Invention, for a Plow with one Coulter is not capable of doing it otherwiſe. The Conſequence of this is, that in a very ſtrong Land that has reſted ſome Time, it is the Work of many Years to get into a good Tilth. This the Farmer who has had Land in ſuch Condition upon his Hands, has never failed to find to his great Trouble, and his Heart will go with me as he reads this Account. The Price of this laborious and repeated Tillage often comes ſo high, that it reduces the Profit of rich Land below that of poor.

It is a common Pretence among the Plowmen, that when they have ſlightly, and imperfectly broke up a Land at the firſt Plowing, they will go deeper, and do it better the ſecond; but they know they promiſe what cannot be performed. It is of the utmoſt Importance to the Farmer to cut and divide ſuch Ground in the moſt perfect Manner: we ſee that the common Plow cannot do it well, and ſeldom does it otherwiſe than by halves; nor is there any other Remedy that is not too expenſive for the poſſible Profit. For this Reaſon the four coulter'd Plow is propoſed to him moſt of all Things on this Occaſion. It is an Inſtrument uſeful on many others, but it was invented for this, and will not fail to anſwer to his perfect Satisfaction. This Land muſt not be plowed a ſecond Time in wet Weather, for that will make the Weeds grow; and if it be done in dry, the Plow will never go deeper than it did at firſt.

Therefore the common Method of Tillage does not anſwer to any tolerable Advantage on ſuch Land. The Farmer ſees this, but he knows not how to help himſelf. If he attempts it by the Breaſt Plow, the Work is very expenſive; and if there be many Stones in the Soil, as is often the Caſe in theſe Lands, it is altogether impracticable. If the Turf be pared off very thin with a Breaſt Plow, and laid to rot before it be plowed in, in the common Way, this may do; but if the Seaſon be wet, it will grow inſtead of rotting; ſo that in moſt Caſes this is a very hazardous Undertaking, and in many it is not at all practicable.

Even digging up the Turf with Spades would not anſwer in this Ground, unleſs it were done extreamly thin, which will never be procured to be faithfully executed at any Expence. As the Spring is uſually wet, there is Danger in cutting up the Turf for rotting any Way at that Time, for Fear of its growing; and if it be deferred till Summer, the Plowing afterwards in dry Weather on ſuch a Soil will be very inconvenient, and the Wheat Seaſon probably loſt.

In theſe Exigencies which happen very frequently, and moſt of all upon the richeſt Land; if the Farmer will venture upon the Breaſt Plow, or that ſlight Plowing which only cuts off the Turf, let him do it not in the common Way, by the Force of a Man's Breaſt and Arms puſhing the Plow before him; but let him have Recourſe to that particular Kind of Plow, which we have directed to be made for the cutting up the Turf for Burnbaiting, and the Roller deſcribed with it. Theſe two Inſtruments will give him an Opportunity of getting up the Turf, and of cutting it to Pieces in a much more eaſy and expeditious Method than the common Way; but yet this is by no Means comparable to the doing it at once by the four coultered Plow.

In the common Way of Plowing, this Kind of Land cannot be cut in Furrows of leſs than ten Inches broad; and to this is owing all the Diſad-

Diſadvantage: to this it is owing that the Land is ſeveral Years before it can be ſufficiently broke and divided, and that the Graſs and Weeds grow with the Corn. But with the four coulter'd Plow this ten Inch Furrow is cut into four equal Parts, ſo that there is no Part above two Inches and a half broad, and this is done thoroughly; for the Coulters cut thus to the whole Depth of the Soil, tho' it be fifteen or ſixteen Inches.

What a prodigious Advantage! and it is done as eaſy as by the common Method of Plowing: for before the Furrow is raiſed by the Share, it lies faſt, and makes an equal Reſiſtance againſt all the Coulters, ſo that they all pierce quite through it.

The dividing the Furrows length-wiſe into four Parts, is not all the Advantage that is gained by working it with the four coultered Plow. This would in a Manner make one plowing anſwer the Purpoſe of four good ones: but beſide this, it is a natural Conſequence that the Furrow is divided croſs-wiſe; for the Ground-wriſt in this Method preſſes and breaks the Right Hand Quarter; and the other three Quarters, as they muſt neceſſarily bend in coming over the Earth Board, break alſo in falling into many ſmall Pieces.

Nothing of this happens in the working by the common Plow, where the Furrow being of ſuch a Thickneſs as very well to keep entire; when the Soil is any thing ſtrong, falls whole. Counting therefore the firſt Diviſion made by the Coulters, and the ſecond by the natural and neceſſary breaking, there is no Queſtion but the four coulter'd Plow does at once Plowing, divide the Soil more than twenty Times as much as the common Plow. It has therefore twenty Times the Uſe; and it does the Farmer twenty Times the Service: we ſee it is very eaſily practicable, and he who ſhall try it will find, that far from our making the moſt of what it will do, very frequently the Advantage is much greater. Frequently when the Earth is of a right Temper, neither too dry nor too wet, the Earth Board in turning the Furrows off will crumble them to Pieces: they ſhall fall into a Kind of Duſt, and hardly ſuch a Thing as a Lump of any Size will remain in the Field.

We have ſhewn already in the firſt Part of this Book, that the breaking and dividing the Earth into ſmall Particles, is the great Thing in which the Benefit of Tillage conſiſts; and it is very evident from the Effects of this Way of Tilling, that one or two common ſlight Plowings after this one Plowing with the four coultered Kind, will reduce the whole Soil in a Manner to Duſt. The whole Depth of the Soil is directly brought into Tilth; and the Turf being cut into theſe ſmall Pieces, rots and decays preſently, adding a Kind of Manure to the Richneſs given by this breaking of the Soil.

The greateſt Uſe of this Plow is in the conquering and reducing a ſtrong Turf; this ſcarce any other Inſtrument of Huſbandry will do without a great deal of Time, whereas the preſent does it at once. When the Turf is cut up large, as it muſt be by the common Plow, the Pieces lie hollow, and as the Air can come to them, they grow; but being cut into ſuch ſmall Pieces by this Plow, they lie cloſe and rot, becauſe they have not Air for growing. The Length of the Roots is alſo a great Diſadvantage in the common Way of Plowing; for they will ſhoot from the Joints, when they are of any good Length, as that Sort of Tillage always leaves them: but in the Uſe of the four coultered Plow, they are not only torn up, but cut to Pieces; and thoſe ſo ſhort, that if they are buried they rot; and if expoſed on the Surface, they ſhrivel and wither, ſo that either Way they periſh.

Any Weather will do for plowing with this Inſtrument, in which a Plow can be uſed, but in general wet is beſt; it may be uſed when the Ground is ever ſo moiſt, provided the Horſes are not mir'd in drawing it: and there is no Way in bringing Land into Tilth in ſo ſhort a Time, or with ſo little Expence as by the Uſe of it. No Farmer ought to be without a Plow of this Kind, who would be ſure that his Land ſhall never be out of Tilth.

As we have mentioned the great Advantages of this Inſtrument, we ſhall name alſo its Inconveniencies, for it is not without theſe, tho' they are nothing in Compariſon of the other. The four Coulter Plow is harder to draw than the common Wheel Plow, and its Beam being longer it lies farther behind, and comes heavier after the Horſes; its whole Weight alſo, the Strength and Thickneſs of the ſeveral Parts being proportion'd to the Length, is conſiderably greater than that of the common Plow.

For this Reaſon it will always be proper to add one Horſe to the uſual Number for the drawing of this Plow; or if a ſtronger Team be employed, the Difference will not be ſo much felt. We give the Farmer this Advice that he may know what he has to do, and ſet out right; but it would be idle to name it as a Counter-balance to thoſe great Advantages which we have ſhewn attend the Uſe of this Inſtrument.

The Difference from the Weight of this Plow, and the Length of the Beam, is not ſo great but that it is near as eaſily drawn in moiſt Weather, as the common Plow is in dry Weather on the ſame Ground, and at the ſame Depth. Indeed one great Reaſon of its following heavily is the Depth to which it cuts; and this is ſo great a Benefit, that it would be very idle in the Farmer to grudge the adding one Horſe to his Team for obtaining it: the four Coulter Plow will, upon Occaſion, cut two Spit deep, as before obſerved, which is a prodigious Advantage; but when this is not required, it will cut as ſhallow as any other Kind, and then the Weight is very little felt.

The cutting the Furrow into four Parts, is ſomething, for adding to the pull of the Horſes, but it is not much. When the Ground is in a right Condition, and the Coulters are in good Order, they cut thro' very eaſily; and the Furrows being thus divided, riſe ſo much the more freely upon the Share and Earth Board, than they would do if whole; that perhaps as much is gained in the Eaſe of working this Way, as is loſt the other.

Plows with two Coulters inſtead of one have been uſed in different Places, and always with the

the greateſt Succeſs; the adding a third and a fourth Coulter, muſt of Neceſſity increaſe the Advantage; and upon the Rules, Deſcriptions, and Figures we have given of the ſeveral Parts, and the putting them together into one whole and regular Inſtrument, we hope the Farmer will not fail of having it done to his Satisfaction. The Difficulty is not great, but the People who make Plows are very ignorant; nothing could have brought the Plow with two Coulters into Diſuſe, but the bad Way of making it: and nothing but the properly putting together this new Kind can be wanting to the bringing it into general Favour.

CHAP. XXXV.

Of the general Benefits and Advantages of Plowing.

WE have conſidered Plowing as the capital Operation of the Huſbandman's Profeſſion, and we have therefore treated it very much at large with Reſpect to the Structure and Make of the Inſtruments of that Name, and Methods of uſing them on particular Occaſions: now that we may leave no uſeful Part of that Operation neglected, we ſhall in this concluding Chapter on that Article, lay down whatſoever of general Matter it may be fit that the practical Huſbandman retain in his Memory.

The plowing of Fallows is a great Advantage to them; this is the Senſe of all Mankind, and Tenants are bound by Articles to perform it at certain ſtated Periods for the Benefit of the Landlord. What is thus required by the Owner, will be alſo, at proper Seaſons, a Benefit to the Perſon who rents the Ground; and in general the Farmer may be aſſured of this, that the Expence he employs in Plowing, will bring him in many Times the Sum in the Produce. The old Authors could ſay univerſally, that the Advantage of Fallowing conſiſted in two Things; which were the expoſing the Soil more to the Sun and Air by turning it up in Ridges, and the breaking the Lumps and Clots of Earth by frequent ſtirring and turning. This is the old Doctrine, it is found in theſe Words in Markham, and that innumerable Set of Writers who have copied from him. This is the Principle upon which the Horſehoeing Huſbandry is eſtabliſhed: therefore it is idle to rail at it, or to conſider it as a new Doctrine.

Mr. Tull was a Perſon of great Induſtry and great Sagacity. He read carefully what was written on Huſbandry, and he adopted the beſt Things; and improved upon them. His Syſtem is new, but the Foundation of it is, as we have ſhewn, in all Reſpects as old as any Thing we know of Huſbandry. It is unjuſt to accuſe it of Novelty and Whim, the Principles on which it is eſtabliſhed are old and true.

The plowing of Fallows, beſide breaking and expoſing the Ground to the Seaſons, kills the Weeds; turning up their Roots to be wither'd by the Air, and overſetting the Seed Shoots before they are of ſuch Growth as to exhauſt the Land.

A great Caution the Farmer is to take is this, that he harrows no more down in Winter than he ſhall quickly be able to raiſe up again in Ridges; for if it get wet by Rain while it lies flat it will grow poachy, and very difficult of plowing afterwards. This is the Caſe moſt of all in wet Lands, and theſe frequently breed ſuch Quantity of Weeds upon it, that they exhauſt a great deal of Nouriſhment while it is expected to be recruiting. The beſt Way is to harrow only in an Afternoon, and to harrow no more than is to be plowed next Morning; or to harrow early in the Morning, what is to be plowed in a few Hours afterwards.

If the preceding Summer have been wet, the Land will naturally be full of Weeds: in this Caſe let the Farmer plow it up early in Winter to kill this uſeleſs Growth, and to mellow the Soil.

The antient Writers ſpeak of a Plow that was managed by one Man only, who could very well both guide and drive. Such a Kind may be made upon the one wheeled Plan; it may be light and ſmall, a ſingle Horſe may draw it, and a ſingle Perſon very well manage it: but this tho' pretty and familiar, will be of a limited Uſe, for it is fit only for a light and well wrought Soil, and is to be uſed only in ſowing Time. Such a one, however, it may very well be worth the Farmer's while to have when he has ſuch Land, for in thoſe Fields in a moiſt Seaſon, it will anſwer excellently.

They uſe at this Time in ſome Parts of the Weſt of England, a Plow that has neither Wheel nor Foot. It is made upon the Principle delivered in Mr. Blith's Huſbandry, but it does not anſwer quite ſo well as he ſeemed to think it would. The Uſe of it is confined to eaſy Ground that is even, for where there are Roots or Irregularities, it does very poorly.

We name all theſe Particulars that the Farmer may take his Choice among them, ſuiting the Kind to the Uſe; for we have ſhewn him the Uſes and Diſadvantages of all the Sorts. Theſe two laſt we have named in this Place, becauſe tho' good in particular Places, and on particular Occaſions, they are not to be rely'd upon in the general Practice.

There have been Propoſals by Dr. Plot and others, for digging Ground for Corn with the Spade as we do for Flowers, and managing a Field as we do a Garden. There is no Doubt of the Succeſs of this, but the Expence muſt be monſtrouſly great; and by the Methods already directed, and to be added when we come to the Article of Hoeing, according to the new Method, the ſame Advantage may be obtained with more Eaſe, and at leſs Expence.

There is alſo another Method to be named on this Occaſion, in which the Plow and Spade are employ'd together, this is called Plow-trenching. It is uſed in deep and light Land. One Furrow is plow'd, and half a Dozen Labourers following at proper Diſtances one from another with Spades, are to dig in the Furrow, and throw up the Earth on the Glebe turned by the Plow. While the Diggers are at this Employment,

ployment, the Plow is to turn up another Furrow at a reaſonable Diſtance; after which the Labourers are to do the ſame there, while the Plow is turning the upper Earth of another Furrow into the former Trench.

The Principle upon which this Practice is founded is very right, but the Method wherein it is done is in the higheſt Degree aukward. We have named it that the Reader may know what Plow-trenching means; but we have delivered Methods of anſwering the ſame Purpoſe in ſo much eaſier a Manner, and at ſo much ſmaller an Expence, that this will never be found worth any Perſons while to think upon.

CHAP. XXXVI.

Of the Benefit of converting Paſture into Arable Land, and of continued plowing.

WE have mentioned occaſionally before, the Propriety there may be in changing Paſture into Arable Land, in order to keep up the Proportion of the two: but this is not the only Thing that may lead to ſuch Practice. Paſtures on certain Soils are very apt to ſpoil of themſelves, and that often when they are rich as well as when they are poor.

The Growth of Moſs is a great Enemy to good Paſturage, and frequently Lands are ſo over-run by it, as to be in a Manner ſpoil'd for Graſs. In this Caſe, if the Methods we have laid down in treating of Manures prove inſufficient for the killing this pernicious Matter, the Farmer muſt, at all Adventures, have Recourſe to plowing. That always ſucceeds, and there is no Way of deſtroying Moſs like it. After a few Crops this Land may be laid down for Graſs again, and will ſucceed excellently.

In all barren and neglected Land, plowing is the great and immediate Method of Improvement. The breaking and dividing of the Soil give it Fertility, as has been ſeen already, and at the ſame Time it kills the Weeds, that never fail to grow in Abundance on ſuch Places, by tearing up and expoſing their Roots.

Sometimes it will happen that a wet Summer will fill a Land with Weeds after what was intended for the laſt plowing in the Fallow, by which it was preparing for Barley; in this Caſe it muſt have another ſtirring during the Winter, in order to kill them. Some content themſelves, in this Caſe, to tear them up with a Harrow; but plowing is much better, and it is then to be laid up high, that it may keep dry the Remainder of the Seaſon, and by the Effects of the Froſts and Air after this, it will be excellently prepar'd for the Seed Time in Spring.

The common Method of Farming is at preſent by the Uſe of Tillage and Manures jointly, and it comes at a very moderate Expence. Suppoſing the Land to be out of Heart, and to take in the whole ordinary Compaſs of the Buſineſs it is this. In April, to begin the Account no ſooner, they lay on twenty Load of Dung to an Acre, this coſts about a Shilling a Load; the Ground being already in Tillage, there will require beſide the Dunging, two Plowings to prepare it for Wheat. Each of theſe Plowings will be about four Shillings an Acre Expence, the Land will be then ready for Wheat in the Beginning of October; the Seed will coſt about five Shillings a Buſhel, and about two Buſhels will be requir'd to an Acre: the weeding, reaping, and binding, will afterwards coſt about five Shillings an Acre more: and the inning of the Harveſt, and repair of Fences, may be ſet at about ſix Shillings an Acre: the Price of thraſhing is according to the Richneſs of the Crop, for the Labourer is paid by the Buſhel. Here is all the Expence, and all the Trouble, and the Harveſt, at a moderate Computation, yields thirty Buſhels of Wheat an Acre.

After this, without the freſh Expence of dunging, the Land will very well bear two Crops more, one of Barley, and another of Peaſe, or the like.

Theſe Crops are of leſs Value, but then they come at a leſs Expence. Barley is mowed inſtead of reaping, ſo that the great Charge in that Article is ſav'd; and Peaſe being cheaper in the Seed, and requiring to have the Ground but once plowed, come more reaſonably yet.

Seven Shillings an Acre is ſav'd in the Crop of Barley, and thirteen Shillings in that of the Peaſe, not counting the ſaving of Dung, ſo that the Charge of theſe Crops is much leſs than that of the Wheat, as well as the Price in the Produce.

This is all that the Country Farmer in general knows of the Buſineſs of Huſbandry, and thus he practiſes it. Yet even this Way the Practice is ſuch, that he can live and lay up ſome Money. The Expence of an Acre of Ground for the three Crops, taking in every Article, is about five Pounds, thirteen Shillings, reckoning at the higheſt; and the Produce of the three, computing in the moſt moderate Way, is about eight Pounds.

This Account may tempt any one to look upon Huſbandry as a profitable Occupation; but when we come to the Practice of it upon the Rules laid down in this Treatiſe, as an intelligent Perſon will put them in Uſe on every Article, we ſhall find that the Produce of Land, where the moſt Expence is employ'd upon it, inſtead of being three or four times equal to the Charge, is ſix, ſeven or eight Times, and often much more.

This may tempt many into the Profeſſion, who have Genius capable of improving it, which will be an Advantage not to themſelves alone, but the Kingdom; and it may ſhew thoſe who are employed in it already, how extreamly it will be worth their while to ſtudy the Rules and Nature of its Operations more deeply, as every Part of their additional Knowledge will be an Addition to their Income.

Having obſerved thus much in general, as a Concluſion of what we had to ſay on that great Article Plowing, we ſhall now come to the Conſideration of thoſe other Operations which are us'd to aſſiſt that original Device in the Improvement of Land by Tillage.

CHAP. XXXVII.

Of Harrowing.

THE Huſbandman underſtands that the great Purpoſe of Tillage is to break the Earth into ſmall Pieces. He ſees how the Plow begins this Work; cutting it up from ſome Depth, and throwing it by, in Quantities more or leſs broken, according to the Nature of the Soil and the Form of the Plow: but though this is a very material Part, it is not all that is to be done in the preparing Soils for Corn. The Harrow and other Inſtruments are to follow, whoſe Uſe is to break and divide the Furrows ſtill more.

The harrowing is the Operation that follows that of plowing, and therefore is proper to be conſidered next after that.

In the old Huſbandry they employed Men to follow the Plow with Inſtruments they call'd Hacks, theſe were a Kind of Hoes, but ſtronger in the Handle than thoſe Inſtruments, and hollow in the Blade, which was well ſteel'd.

Theſe People, whom from the Inſtruments they us'd, they call'd Hackers, were to follow the firſt plowing, and to cut and hack the larger Lumps to Pieces, and after theſe followed the harrowing. But the preſent Practice having greatly improved the Plow, there is no farther Need of that Inſtrument or that expenſive Manual Labour, but the next Operation to plowing is the harrowing.

This is done by an Inſtrument armed with Iron Points, which being drawn over the Ground, tears up the Lumps left unbroken by the Plow, and breaks them to Pieces.

The Harrow is drawn by Horſes, and accordcording to its Form requires more of them or fewer, and does more or leſs Service, but in general it breaks the Ground, and brings up a great deal of good Mould.

Various Methods are uſed as to the Article of ſowing, according to the different Practice of Huſbandmen in different Places, and with reſpect to the Kinds of the Crop, all which are to come hereafter into Conſideration. But here it may be proper to obſerve in general, that the Harrow, beſides its Uſe already named in breaking the Ground, has another, which is the covering of the Seed.

It is repeated one or more Times, for the ſole Purpoſe of breaking and dividing the Clots, and when the Corn is ſown upon the Land thus till'd, or otherwiſe, the Harrows are to be drawn over it again, to cover the Seed: this muſt be done with Care, and it anſwers a double Purpoſe; for beſide the covering the Seed, it breaks the Clods once again, and ſcatters a fine Duſt over the Seeds, which is of the greateſt Service in their firſt Growth.

We have ſeen that the Plow anſwers to the Purpoſe of the Spade in Gardening; and in the ſame Manner the Harrow ſerves in the Place of the Rake. The Plow is a Spade drawn by Horſes, and the Harrow is many Rakes faſtened together, and worked in the ſame Manner.

The lighter and looſer the Earth, the more compleatly the Plow breaks it, and the leſs Need there is of the Harrow; but there is no Ground whatſoever that will not be the better for the harrowing, which covers the Seed. When this is omitted it is thrown among looſe Clods of Earth. It is left in a great Degree naked, and is ready for all Kinds of Vermine that devour it; and when it ſhoots has neither fine Mould about it, nor is able to penetrate theſe tough Lumps. It languiſhes therefore in a Soil that would, in proper Order, be very well able to ſupport and nouriſh it, and this proper Condition will be given it by the Harrow.

But let the Huſbandman, while he makes himſelf ſenſible of the Advantages and Benefit of harrowing, be cautious that he do not expect too much from it, or depend upon it in Caſes where he ſhould have Recourſe to more powerful Methods of breaking the Ground. This is a Caution the more neceſſary, becauſe it is an Error that the preſent Farmers very frequently run into. They often neglect to give their Land a due plowing, truſting to the Harrow to make it fine. When they have thrown in their Seed they go over it with a Harrow, and being ſenſible that the Clods of Earth muſt be broken, and that they have not done this ſufficiently with the Plow, when they ſee once or twice harrowing does not effect it, they go over the Ground again and again, till the Feet of the Horſes have trod the Soil into a Hardneſs that is very unfit for the Growth of any thing.

There are Soils in which treading, at a proper Seaſon, is ſerviceable to give them a Firmneſs, which they naturally want, but in others nothing is more deſtructive.

CHAP. XXXVIII.

Of the various Kinds of Harrows.

THE Harrow, as it follows the Plow in Uſe, ſo in all Probability was the Inſtrument next invented after it. Like the Reſt it was clumſy and inconvenient in its firſt Contrivance; and has been, from time to time, improved more and more, by the Ingenuity of Huſbandmen. We ſhall conſider it under the Forms it has got in theſe ſeveral Alterations, and ſhew its Uſe in the plaineſt and in the moſt perfect State.

The common Harrow is an Inſtrument too well known to need much Deſcription, it conſiſts of croſs Beams and Iron Spikes; and all that we ſhall adviſe the Farmer reſpecting it is, that he have it made firm and ſolid, for no Inſtrument in all his Profeſſion ſuffers more by being made ſlight than this. Let him ſee that the Spikes, or Tines, are large and well fix'd, and in the working let him have an Eye that it go evenly over the Ground.

The great Harrow differs from this principally in its Bulk, and the Solidity of its Structure. It is a ſtouter Inſtrument, and every way better fitted for Service. It conſiſts of eight Beams, diſpoſed croſs-wiſe, as in the common Harrow. Theſe are ſeven Foot long, and four Inches and a half ſquare. The Iron Spikes, or Tines, are

like the Wood-work large and maſſy; they are twice as thick, and once and a half as long as thoſe of the common Harrow. The Wood-work of this Harrow ſhould be Aſh, and a good Workman muſt be employed; for if it be not framed very well together, it will tear itſelf to Pieces preſently in the working. The Joints of the Woodwork muſt be all firm, and the Tines fixed in the moſt ſecure Manner; and then it becomes a very ſerviceable Inſtrument. The Tines in this great Harrow are to be placed at the ſame Diſtance as in the common Kind.

The Uſe of this Harrow is for breaking the Ground, not for covering the Seed; for that is to be done in the ſame Field with the lighter Harrow. This requires commonly three Horſes to draw it: and in very ſtrong Lands ſometimes more; but by its Weight, and the Length of its Tines, it tears away very deep, and has a Force to break the Clods much better than the common Kind. This is fitteſt for the ſtubborneſt and hardeſt Kinds of Land; and is there of ſuch Service, that the Farmers think its Effect equal to a ſlight Plowing.

It may be dangerous for the Huſbandman to truſt to it in this Reſpect ſo far as to neglect the neceſſary Plowings; for at the beſt it is not equal to that Operation; but following it, and in ſome Lands following the Roller, it will be found of vaſt Advantage.

The Drag is an Inſtrument of the ſame Kind with the Harrow, and differs in nothing from the great Harrow laſt deſcribed, but in the Weight and in the Awkwardneſs of the Contrivance. The great Harrow is ſufficient for all Purpoſes of tearing up the Ground in that Manner, therefore this Invention was unneceſſary.

The Drag is compoſed of eight Beams, each eight Foot long, and of a great Thickneſs; they are placed croſswiſe, but at Diſtances much larger than in the great Harrow; and the Spikes which are very thick and long, ſtand alſo at greater Intervals: this unwieldy Inſtrument cannot be managed with leſs than four Horſes, and ſometimes they add a fifth, the four in Couples and the odd one alone in Front. In this Way the Thing is lugged along very unevenly and irregularly; it digs deep, and tears up a great deal, but the Diſtance between the Tines makes it leave a great deal untouched, and a great many Clods unbroken.

The principal Uſe that is made of theſe Drags, is in the preparing of Land newly plowed up from Sward. When the Soil in ſuch Caſes is rich, and the Turf tough, there is nothing more difficult than the getting ſuch Land into Tilth. We have already, under the Article of Plowing, explained the Difficulties of this Article in the Huſbandman's Buſineſs, and recommended the doing it by Means of the four coultered Plow. As we have here mentioned the Uſe of a Drag as being common to this Purpoſe, we muſt caution the prudent Reader from being miſled by the common Method in this Reſpect, for often nothing is a worſe Practice.

When a Land of this Kind has been plowed up in the common Way, the Furrows being large, the Turf lies in long Ropes, and will continue growing. To prevent this, theſe Furrows muſt be broke to Pieces. This has been try'd among the earlieſt Huſbandmen by croſs Plowing; and of later Times by this unwieldy Inſtrument, the Drag, but both with very little Succeſs.

In the common Way with the Plow, which is the old Method, they lie too looſe to make a due Reſiſtance to the Coulter; and ſo they riſe before it, and are dragged into irregular Heaps, and thus left about the Field inſtead of being cut to Pieces. In this Caſe, the Turf, inſtead of rotting, grows on, and defeats the Purpoſe of the Tillage.

In the other Way by this Inſtrument the Drag, it is ſtill worſe. The Practice is to lug this acroſs the Field in order to tear the graſſy Furrows to Pieces; but this cannot ſucceed to any Purpoſe, for theſe Furrows are very firm and tough, and require a keen Edge to cut them. As the Coulter could not do this in the former Attempt of croſs Plowing, it is impoſſible the Tines of this Drag ſhould do it, becauſe they have no Edge; and, in general, although ſome Parts are torn to Pieces this Way, yet the moſt of the turfy Matter is in a worſe Manner dragged up in Heaps, and the under Part of the Earth is often left bare for great Spaces together.

This is not anſwering any Purpoſe: we have ſhewn already what Method is to be uſed on the Occaſion; and as this Inſtrument the Drag does not ſucceed here, neither will it anſwer to any other uſeful Purpoſe. We have mentioned its Form and Make, that nothing might be deficient; but we adviſe the prudent Huſbandman to have nothing to do with it: let him truſt to the common Harrow in light Soils, and have Recourſe to the great Harrow in the others, and he will need to trouble himſelf no farther on that Head.

We have now to mention another Kind of Harrow, ſince it is cuſtomary to call it by that Name, which is uſed in Graſs Lands; and from that we ſhall paſs to the Structure and Uſe of that natural Contrivance, the Drill Harrow, which will be treated in a diſtinct Chapter.

The Harrow uſed on Graſs Lands, is not compoſed of Beams and Tines as the other, but of ſome ſlighter Wood-work and Buſhes, it is thence called the Buſh Harrow, and is uſed for ſpreading the Dung or other Manure, carefully and evenly over their Grounds. Its Benefit is very great, tho' of a Kind altogether different from that of the common Harrow, the Sort before deſcribed. The Uſe of that is to break the Clods of Earth, the Buſineſs of this is to ſpread what is laid upon the Ground for enriching it.

We have already in our Second Book, treating of Manures, named thoſe ſeverally which are to be uſed on Paſture Grounds. Whichever of theſe are employed, let the Farmer as ſoon as ever he has got it ſpread upon the Ground, ſend in Women or Children, or others who work cheap, to pick up the Sticks, Stones, or whatever other Rubbiſh may have come among it; and as ſoon as this is done, let him have Recourſe to the Buſh Harrow, for the more perfect dividing and diſtributing the Manure.

Whatever Care may have been taken in ſpreading it by Hand, many of the Clods will remain unbroken,

unbroken, and it will be thicker in ſome Places than in others: it is the Intereſt of the Farmer to have it broke perfectly to Pieces, and to have it ſpread and diſtributed equally, and this is the Office of the Buſh Harrow.

If the Manure be of the tender Kind, as the Bottoms of old Hay Stacks, very rotten Dung, or the like; he may immediately draw this Harrow over it, and it will break and diſtribute it very well: but if it be of a harder Kind, as the Mud from Ponds that has any Firmneſs, or the like; then let him leave it ſpread on the Ground for ſome Days, and after the Sun has crack'd the Lumps, take the Advantage of the firſt Shower, and immediately uſe his Buſh Harrow.

Having thus directed the proper Uſe of this Inſtrument, we ſhall deſcribe its Make, which is the plaineſt and moſt natural in the World. Nothing ſavours ſo much of the old Original Huſbandry, as this Inſtrument in its firſt State, nor is it much more elegant in the neweſt Improvements.

The Original Buſh Harrow conſiſted of a Hawthorn cut freſh from the Hedge, and a little loaded to preſs it down; this is ſtill uſed in ſome Places, and, when rightly manag'd, does as well as any, the Method is this.

Let the Farmer look among his Hedges for a ſmall leav'd Hawthorn: theſe naturally are more buſhy than thoſe with broader Leaves; and let him chuſe out the moſt ſhrubby that he can find. Let him cut down a large Stem of this, where it may be beſt ſpared, and laying it on the Ground beat and preſs it as flat as he can with a Board, breaking the Branches as little as may be. Such Boughs as will not be preſſed down muſt be cut off, and thruſt into the Body of the Buſh in the openeſt Places; and ſome other Boughs from the Hedge may in the ſame Manner be thruſt in to thicken it, if there be Occaſion. Theſe added Buſhes are to be well tied in, and when the Surface is flat, full, and very rough, let it be laid on the Ground again, and two or three good Logs of Wood tied on upon the Back to make it firm and heavy.

The Harneſs of a ſingle Horſe is to be fix'd to the End of the Stem where it was cut off, and thus it is to be drawn over the Ground. It will tear and ſcatter the Manure in a very excellent and perfect Manner.

This is the Original Form of the Buſh Harrow, as our oldeſt Writers deſcribe it, and as it was doubtleſs practiſed from the very firſt Invention of manuring Paſture Ground: its Improvement brings it nearer the common Harrow in Form, but the material Part is the ſame; for the Work is performed by natural Buſhes. The Method of making it is this.

Lay an old Gate upon the Ground, but let it be one that is not rotten, but will hold well together. Let there be a Parcel of Blackthorns cut up, and take the buſhyeſt and rougheſt of theſe. Draw them in, and work them between and among the Bars of the Gate, faſtening them by Nails, Cords, and otherwiſe, till the whole Surface be well covered, and very rough: then turn it up, and the buſhy Part lying to the Ground, it is fit for Uſe. The Traces are to be fixed to the Center of the Gate that it may draw evenly, and it is to be dragged over the Ground as before. This is a more compact Inſtrument than the other, but it is heavier. The Bars of the Gate ſerve as the Wood-work of the Harrow in the other Kinds, and the Buſhes anſwer the Purpoſe of Teeth. The Blackthorn is prefered to the common Whitethorn on this Occaſion becauſe it is tougher, and the Thorns are harder. It would be better for the other Purpoſe as well as this, were it not that it does not grow large enough to be uſed ſingly.

Which of theſe two the Farmer ſhall prefer, muſt be determined by the Nature of the Manure he has uſed. The Convenience of the firſt Kind is, that it is eaſily drawn; the Advantage of the other is, that it is heavy and ſtrong. When the Manure is of the tenderer Sorts the firſt Kind is beſt; but when it is tougher, and the Clods require more breaking, that made with the Gate is beſt.

All theſe Kinds of Harrows are to have a Hook of Iron for the faſtening the Traces to them by which they are to be drawn; and this ſhould be well fixed on the Inſide that it may not ſtir.

The Holes where the Tines are let in in the common Kinds, are called the Bulls, and the Tines are in ſome Places called the Tuſhes, and the Pins; in others, the Nails of the Harrow.

CHAP. XXXIX.

Of the Drill Harrow.

THIS is a Harrow of a particular Form, and of very late Invention, but it is of excellent Service. The Drill Huſbandry is one of the greateſt Improvements made within this Century, and this Inſtrument is a Part of the Preparation for it.

The Method of Drilling is this; when the Ridges are properly raiſed, and are become moiſt enough at Top, they are harrow'd once, and that only lengthwiſe, and then they are drilled. Once Harrowing is generally ſufficient, but the Eye of the Farmer is to judge whether it be or not; and, if not, he is to order it to be repeated.

If he find after this once Harrowing, that the Tops of the Ridges are not levelled fit for the Drill to paſs thereon, and reach to the due Depth, the Ground muſt then be harrowed a ſecond or a third Time, till it be in a proper Condition.

The Land being thus perfectly prepared, the Drill is to be brought on. This makes Channels for the Reception of the Seed; and that theſe may not remain open, the Drill Harrow follows, and drawing the Earth together fills them up.

The harrowing of the Ridges to prepare for the Drill, is to be performed by the common Harrow. The Drill Harrow follows the Drill Plow, and is of no other Uſe than the covering up the Seed in thoſe Trenches wherein it is laid, by this particular Method of Huſbandry.

It was needful to ſay thus much in this Place

to explain the Nature of the Operation of this Inſtrument, all which will be underſtood more fully when we come to treat of that Method at large; but having thus far explained it on the preſent Occaſion, we ſhall be underſtood in the Deſcription of the Inſtrument itſelf.

This, for ſo uſeful a Thing, is exceedingly plain and ſimple. It is never uſed alone, but always to follow the Drill Plow; and it conſiſts only of two Beams, by which it is faſtened to the Plow; a croſs Bar fixed to thoſe two Beams, and a Couple of wooden Teeth let into that Bar: theſe are all its Tines.

We ſhall deſcribe here particularly the Dimenſions of that uſed as a Part of the common Wheat Drill Plow. The Harrow which moves on its Beams covers the Seed: and is thus conſtructed.

The Legs are a Couple of narrow and flat Pieces faſten'd to the Beams of the Plow at their Tops, on the Inſide of thoſe Beams: the faſtening is by a Couple of ſtout Iron Pins, which paſs through the Tops of the Legs, and the Beams of the Plow, and are faſtened on the Outſide of thoſe Beams by Nuts and Screws. Theſe Pins are to be made ſquare where they paſs through the Beams, that they may be held the faſter, and may not be able to turn round in them; but they are to be round near the Heads that the Harrow may move the more freely on them. The other End of theſe Legs of the Harrow is cut round, and they are let through the croſs Bar, which is called the Head of this Harrow, by Holes made for that Purpoſe, and are pinned in behind it; that either Tine of the Harrow may deſcend at the Time the other riſes, where the Ground is uneven. The two Tines are flat Pieces of Wood, they are let thro' the croſs Bar or Head at two and twenty Inches Diſtance from one another. They are to be pinned in above the Head; and each is to have a Shoulder underneath. Theſe are to be ſet ſloping, ſo that if they take hold of any Clods, they do not drive them before them, but riſe over them.

They muſt be of ſuch Length as to give Room for the Harrow to ſink and riſe without moving the Shares up; and to give them the more Room to move, the Legs of the Harrow are to be bent downwards, towards the Middle.

By the Diſtance of two and twenty Inches allowed to two Tines of this Harrow; each Tine going three Inches and a half on the Outſide of each Channel that is next it, fills it up with Earth upon the Seed from the Outſide of it. This gives an Inch in the two Rows Diſtance when they riſe; for, as they will come up nearer the Inſides becauſe the Earth is thrown in nearer the Outſide, they will ſtand but fourteen Inches aſunder, tho' the Channels were made at fifteen Inches. The ſloping of the Points alſo, which is always to be made outwards, brings in ſo much the more Earth to the Channels.

When this Harrow is found to be too light, a Stone is to be tied to the croſs Bar or Head, and faſten'd evenly upon the Middle of it; or a Box made of Boards, and fitted on in that Place is uſed, which is filled with Earth or other weighty Materials to keep it ſteady. A triangular Harrow with many Tines, may alſo be made for uſing between the Rows in the Horſe-hoeing Huſbandry.

In moſt Lands, and on moſt Occaſions, the Harrow, which is a Part of a Drill Plow, is ſufficient for the Purpoſe of covering the Seeds, but it will not always anſwer; and the Farmer is not in favour of any new Contrivance, to give up the old when they may be uſeful.

For Inſtance, there are many Occaſions on which the common Harrow may with great Convenience be called in to aſſiſt this Drill Harrow in covering the Seeds.

In tough Soils when the Land is drilled late, and the Earth is moſt, it will ſtick to the Shares in great Quantities; and in this Caſe not only the Motion of the Plow is hurt, but the Channels will be in Part left open by the Drill Harrow.

For theſe Reaſons it will be beſt in ſuch Land to take off the Drill Harrow from the Plow, and truſt to the covering of the Seeds up in the Channels, entirely to the common Harrow.

When the Drill Harrow is taken off, a Man may follow the Plow in theſe Soils with a Paddle, or a forked Stick in his Hand, to clean the Sheats from this ſtiff Dirt. In this Caſe the Channels, with the Seed in them, will lie in many Parts open, and a common Harrow is to be drawn over the Ground to cover them: for this Purpoſe if the Farmer ſhall rather chuſe to improve his Drill Harrow than to employ the other, it will be proper for him to order it in this Manner. Let the Tines be of Iron inſtead of Wood; and let the Legs be placed at the End of the Plank, remote from the Sheats of the Plow. In this Caſe the Sheats may be cleaned, tho' the Harrow be on, and theſe Iron Tines will not fail to cover in the Channels.

The Drill in this Caſe ſhould have only two Shares, and they ſhould ſtand at about fourteen Inches Diſtance. In this Caſe the Harrow anſwers its Purpoſe in ſpite of the Inconveniencies of the Ground; and the Harrow, beſide its common Uſe, ſerves to turn it.

This is the Way of making the Drill Harrow anſwer on all Occaſions; but it is a very good Method for Wheat in particular, to draw a common Harrow once over the Ground afterwards; for nothing lays it ſo well.

For this Purpoſe it will be proper to uſe two Harrows coupled together, as is a common Cuſtom on many Occaſions; and they ſhould in this Caſe be of the common Make, and of the lighteſt Kind; and the Pole that faſtens them together ſhould be tied in two Places, that they may always go level.

This is a proper Caution for harrowing all Land that is in Ridges; for otherwiſe the Ridges will be too ſharp at the Top, and the Partitions might lie higher than the Rows. Two Harrows thus joined together, go as level and even as one.

The harrowing of Ridges muſt never be croſs-wiſe, unleſs they are to be made level for croſs Plowing, in order to lay out the Ridges in a Breadth different from that they had before.

When the Ridges are too high, they may be

lower'd by this Kind of Harrowing; and it is not attended with the common Miſchief of treading down the Ground, for the Horſe when he draws two light Harrows thus joined together, always treads in the Furrow that is between them.

CHAP. XL.

Of Rolling.

ROLLING is like the preceding Practices, an old Method of Huſbandry. Even in Times when the Uſe of that convenient and familiar Inſtrument, the Roller, was not known, they uſed others to break the Clods of Earth in the ſame Manner as that does it; and theſe, under the Name of Mallets, or Mauls, are uſed at this Time in many Parts of the Kingdom: the Roller is, however, ſo much more convenient, that it ought to be taken every where into their Place.

As Harrowing is on ſome Occaſions performed before, and on ſome after Sowing, ſo is Rolling: and it is alſo ſometimes uſed before, ſometimes after Harrowing; and very frequently and properly between the two Harrowings of the ſame Piece of Ground.

The great Uſe of all Tillage is to break and divide the Ground; and where there are Lumps of a dry and brittle Earth, the Roller anſwers very well to that Purpoſe. It ſhould be on this Occaſion uſed only on ſuch Lands; but the Huſbandmen of ENGLAND, for want of making theſe Diſtinctions, do themſelves great Injury.

In Barley Land the Roller has another Uſe. It not only breaks the Clods of Earth, but ſmooths and levels the whole Surface of the Ground that it may be fit for Mowing.

In the old Huſbandry when they had ſown the Ground, and harrowed in the Seed, they uſed to go over it with a great wooden Beetle, with a heavy rounded Head: with this they broke the Clods they found left by the Teeth of the Harrow; and when even this Practice had not divided them ſufficiently, they afterwards took the Advantage of the firſt good Shower, and went over the Field again with another Kind of Beetle, and beat and broke them again. This laſt Weapon, inſtead of the round Head of the other, had a flat Piece of Board faſten'd in a ſlanting Direction to the Handle, and of about a Foot ſquare, and two Inches thick. This they uſually made of Aſh, or ſome other tough Wood, and by its Blows ſtriking it down and drawing it back, they broke and pulled the Lumps to Pieces, which had eſcaped the Teeth of the Harrow, and had not been ſufficiently divided by the former Beetle.

Theſe were the Operations of the old Huſbandry, and theſe are ſupplied by the Roller in the ſame Manner, only with more Convenience and Eaſe. But here a great Caution is to be given the Huſbandman, that he do not, by an improper Uſe, make that hurtful which might be very beneficial. As the Intent of all Tillage is the properly dividing of the Ground; when the Roller breaks the Lumps of Earth it anſwers that Purpoſe. It does this when it is uſed on proper Soils, and at proper Seaſons; but otherwiſe it may take an exactly contrary Effect.

Thus, when the Earth is of a tender Kind, and the Seaſon dry, the Lumps are no Way whatever broken better than by the Preſſure of the Roller: but if the Farmer will draw this heavy Implement over a Piece of Land that is of a tough Soil, and in a damp Condition, he will preſs it into Cakes inſtead of breaking the Lumps; and taking juſt a contrary Effect to what it ought, this Inſtrument will in a Manner un-till the Land inſtead of tilling it.

This is moſt miſchievous of all when it is practiſed after the Seed is ſown; for, in that Caſe, it ſqueezes the Soil into Cakes above it, which its tender Shoot will not well be able to pierce; and makes it ſo tough and ſtiff about it, that the ſmall Roots will very difficultly make their Paſſage.

This is the Condition of ſuch Land before it is tilled, and the rolling it after ſowing in this Manner, does a great deal toward reducing it to the old Condition again.

All ſtrong Land when it is broken and divided by Tillage, is put out of its natural Condition; and it is from that Time the Tillage is ended, ſubſiding and ſaddening into its old Condition again. This is the Huſbandman's great Misfortune; but he muſt be very blameable indeed if he aſſiſt it, as he certainly does in a very powerful Manner, when he rolls ſuch a Piece of tough Land in a moiſt Seaſon after Sowing.

From this reaſonable Account of the Nature of Tillage, and of the Effect of Rolling, it will eaſily be ſeen that the great Uſe of that Inſtrument is on light Soils, and in dry Times; and that its beſt Service is when it is uſed in the Intervals between one harrowing and another.

For Barley Land it is very fit to be done after ſowing, rolling with Diſcretion, and avoiding the before-mention'd Errors. Its Uſe, in this Caſe, is evident; becauſe the Smoothneſs and Levelneſs of the Ground makes it fit for Mowing: but, in the other Caſe, it is a proper Inſtrument in the immediate Purpoſe of Tillage, ſerving to break the Clods and divide the Soil.

This is the great Uſe of the Roller, and 'tis therefore the proper Soils are the light Kinds; the proper Seaſons are the drieſt, and the Place it holds in the right Practice of Huſbandry, is between the Harrowing and the ſecond Plowing.

Thus when a Piece of Land has been plowed once, let it be harrowed: this breaks many of the Pieces that are too large in the Furrows, and tears up the Clods: then let the Roller be drawn over the Ground, it will break in a proper Manner, and the Clods pulled up by the Teeth of the Harrow, and will prepare the Land excellently for plowing again. This ſucceſſive Uſe of the Plow, the Harrow, and the Roller, is the moſt regular and certain Way of breaking and dividing a hard Soil, and bringing it into a Condition to nouriſh the Crop.

CHAP. XLI.

Of the ſeveral Kinds of Rollers.

ROLLERS are of different Kinds, Forms, and Materials. Some are ſimple, and others armed with Spikes, or with Edges. In Gardens they uſe them of Stone or Iron, but in Fields they are of Wood, except the ſhort Roller for Horſehoeing Huſbandry; for the Iron or Stone Rollers would there preſs almoſt any Kind of Land into Cakes, by their Weight.

The common Roller for the Field is made of the Trunk of a good thick Tree. It ſhould be about eight Foot long, made even all the Way, and fix'd in a plain Frame, in the which it can turn with Eaſe, and by Means of the fore Part of which it may be drawn by one or more Horſes, according to its Weight, the Strength of the Beaſts, and the Nature of the Ground. From the fore Part of the Frame there run a Pair of wooden Shafts, and the hinder Horſe is put into theſe for the more ſteady drawing; and turning at the Land's End, without Trouble.

Next after this, which is the common Roller of our Farmers, we ſhall deſcribe that which is us'd in the Horſehoeing Huſbandry, that being a plain Roller alſo, though differing in Size and Materials.

This contradicts the general Practice of makeing the Rollers of Wood for the Field, in that it is made of Stone. It ſeems of the middle Kind, or to have been contrived between the Garden and the Field Roller, being a ſmall Stone Garden Roller, ſet in a two Shaft Frame for the Convenience of being drawn by a Horſe.

The Conſtruction of this Kind is very eaſy. The Stone is to be a Yard long, and two Foot ſix Inches in Diameter. Of this Size it generally weighs about eleven Hundred Weight; ſo that it is very capable of preſſing firmly, and is ſo ſhort that it is eaſily and conveniently managed.

Its Shortneſs alſo ſuits it excellently for the Purpoſe of that Kind of Huſbandry, becauſe it can conveniently be drawn in the Spaces left by that Method, where the common great Roller could not come.

The Frame of this is very plain and familiar, it conſiſts only of two Legs or Limbers, through which the Axletree comes at each End, and which are joined together by a Couple of croſs Bars near the Stone. This is the whole Contrivance. A Couple of Pegs are driven in each Limber near the Point, which ſerve to faſten in the Horſe, and then this little Inſtrument is ready for Service.

The two croſs Bars are to be of Wood, and they ſhould be tolerably ſtrong, and faſtened into the Limbers by Pins. The Ends of the Axletree of the Stone muſt not ſtand out beyond the outer Surface of the Limbers, becauſe they would do Miſchief by laying hold of the Plants, as this is to be drawn between the Rows; and the hinder Ends of the Limbers ſhould be made to turn a little up for the ſame Reaſon.

The Farmer who ſhall make a Roller on this Plan, muſt remember the Caution we have given of the Miſchief that may be done by Rollers, and never uſe it but in the dryeſt Weather; becauſe by its Weight it is capable of doing much more Harm than any other Kind.

It ſupplies in this, which is its proper Seaſon, the Uſe of the Plow and Harrow, breaking the Clods almoſt to Powder; ſo that the leaſt Rains that follow, diſſolve and break them to Pieces.

This Roller, in very dry Weather, is excellent for preparing the Ridges for Turnips. When the Land is in ſuch vaſt Lumps at Midſummer, that neither the Plow nor Harrow can touch them, this Roller, drawn over the Land, will burſt and break them, and it may be eaſily plowed and harrowed afterwards, ſo as to be made fit for the Seed.

In the common Methods of Huſbandry the ſpiked Roller, the Structure of which will be plainly enough underſtood by the Figure, is excellent to ſubdue the ſtubborn Land in dry Summers.

When the Ground can no other Way be got into Order for Turnips, this Roller, followed by the great Harrow, deſcribed in a preceding Chapter, are excellent.

We have added alſo in this Place, the Figure of that particular Roller, we have deſcribed under the Article of Burnbaiting. This may be called the edged Roller. The only Caution needful to be given the Farmer about this is, that he make the Roller itſelf heavy enough, and the Blades ſtout enough, and ſharp enough. They will be uſeful on other Occaſions, beſide that of Burnbaiting, as has been obſerved already: and indeed on whatever Occaſion there is to cut through long and ropy Furrows, no Inſtrument is ſo proper.

CHAP. XLII.

Of the great Advantages of Rolling.

HAVING, in the two preceding Chapters, given the Reader an Account of the Methods of Rolling, acquainted him with the Form and Structure of the ſeveral Inſtruments us'd for that Purpoſe, and cautioned him againſt the Miſtakes into which he might otherwiſe have fallen in the Uſe of them; we ſhall here deliver more at large the Advantages attending the Uſe of that Inſtrument, all of which are perhaps not ſufficiently attended to any more than all the Inconveniences.

The great Miſchief that may attend the Practice of rolling, is the preſſing down and hardening the Ground; but we are to remind the Farmer, that there are Lands of ſo very light and naturally looſe a Kind, that this preſſing them down may, at a proper Seaſon, inſtead of doing Miſchief, be an Advantage to them.

We have mentioned the Good Sheep do to certain light Soils, by treading them when put upon them: and theſe when they are of the moſt crumbly Kind, are often rendered ſo looſe by the Weather, that they cannot afford a ſufficient Hold to the Roots of the Crop. In this

Caſe

Caſe the Uſe of the Roller is excellent, for it preſſes and fixes the Soil.

This is ſo neceſſary in ſome Places, that the Farmer, though he plow and otherwiſe work his Soil ever ſo well, if he omit to roll it will never get half his Crop. Chalks, and the white clayey Soils, are of this Kind; and ſome others.

Barley is the Crop they roll the moſt conſtantly; but taking proper Opportunities, and doing it in a right Manner, it is equally ſerviceable to Beans, Peaſe, and other Kinds, not excepting Wheat. It anſwers many excellent Purpoſes, and at once ſtrengthens and preſerves their Growth.

One material Advantage of Rolling is, that it deſtroys Inſects, and particularly the naked Snail, commonly called the Slug. This Creature breeds in great Quantity among the young Growth, and devours immoderately. Of all Crops Peaſe are its Favourite, and it eats them from their firſt Shoot, till the Time of gathering. The great Abundance of this Creature is in the Beginning of Spring, eſpecially if the Seaſon prove warm and ſhowery; and its principal Time of eating is the Morning eſpecially, very early; for as the Day riſes it gets into the Ground.

This Knowledge of the Nature of the Creature, will inform the Farmer how he is to deſtroy it.

The Beginning of Spring is the Seaſon for Rolling, and he muſt do it very early in the Morning, while the Creature is above the Ground.

Let him obſerve the Cautions already given, and avoiding thoſe Miſtakes with Reſpect to the Nature and Temper of the Soil, and he will at once, by this Practice of Rolling, deſtroy the Enemy of his Crop, and make the looſe Earth firm for its Support.

It falls out happily for him that the Time of the Slug's greateſt Abundance, is the very Seaſon for Rolling his Field in another Reſpect, becauſe his Crops are at this Time in a Condition to bear it, which they will not when they are more grown.

The Seaſon for rolling Corn is the Beginning of April, and the beſt Method is to roll that which lies in broad Lands twice in a Place, beginning at Day-break.

In dry and looſe Soils the Roots of Corn are apt to be parched and burnt up in long Droughts, and they will ſuffer greatly by but moderately hot and dry Weather while they are young. The Cauſe of this is, that this looſe Earth not cloſing about their Roots, gives Paſſage to the Air and Sun directly to them. Here the Roller comes into great Service, for it preſſes and flats down the Surface of theſe light Soils, and puts them into the Condition of ſuch as are heavier.

This rolling the Earth while the Corn is young, has alſo the Effect of giving them another Dreſſing, for it breaks and preſſes the little Lumps of the Soil to Pieces, and this is one great Article of Tillage as has been ſhewn at large before.

But in all this the Farmer is to take Care that he do not, by rolling improperly, do more Miſchief than he can poſſibly reap Advantage. We have adviſed him againſt rolling tough Soils, and againſt rolling any in wet Weather; and this laſt is ſo needful a Caution, even with reſpect to the lighteſt Lands of all, that if he ſhould attempt it he would deſtroy his Crop. The Feet of the Horſes would, in this Caſe, do incredible Miſchief, beſide the Action of the Roller.

Corn muſt be at a proper Growth before the Roller is introduced; that is, the Leaves muſt be ſtrong, but the Stalks muſt not be at all hardened. And though moiſt Weather is known to call out the Slug, the Farmer muſt ſtay for ſome that is dry, before he can take this Method of killing it.

When a light Land is roll'd at a proper Seaſon, it becomes ſo preſs'd about the Roots of the Corn, that it is able to ſupport the Stalks as they grow up, whereas otherwiſe they would have rocked about and fallen: but this muſt be done before the Stalks are grown to any Height, or have acquired any Strength, for when they have got a little Firmneſs the Roller breaks them, and they never recover it.

For this Reaſon Wheat in a very looſe Soil, may be rolled in October and November, and in January, February, and March; the Winter rolling will prevent the ill Effect of Froſts, as the Spring rolling will that of Droughts.

Great Care is to be employed alſo in the rolling of Barley. This muſt not be rolled too young, for then the Preſſure of every little Clod will cruſh and deſtroy a Leaf, and the Root having little Strength, will not be able to renew it; and if it be roll'd too late the ſame Miſchief will happen as juſt named of Wheat; that the Stalks will be broken, and the Crop that Way ſpoiled.

Upon the whole, the prudent Farmer will ſee that there is not any Part of his Profeſſion which requires ſo much Judgment as the rolling Corn Lands to Advantage. We would not have ſhewn the Benefits, without firſt laying down the Cautions in a very ſtrict Manner; and here we are obliged to give more. The Soil, the Growth, and the Weather, are all to be very carefully obſerved: when all theſe favour, the Benefit of rolling will be very great; but when they do not the Miſchief may be greater.

This Roller is us'd on Paſture Ground as well as Corn Lands, with conſiderable Advantage, the Seaſon for that is March, the Earth being then a little moiſt. It cruſhes down Worm Caſts and ſmall Ant-hills, and riſing Mole-hills, eſtabliſhing the Earth about the Roots of the Graſs, and making the Surface level for the Scythe. There will need no farther Caution on this Head, but that the Roller muſt always be of the heavieſt Kind.

BOOK

BOOK VI. PART IV.

Of the different Manners of Sowing.

CHAP. XLIII.

Of Sowing in general.

WE are here treating of Huſbandry, and its ſeveral Operations; and in whatſoever Method we ſhould have diſpoſed theſe, there would have been Room for thoſe who love to cavil, to have diſputed the Propriety of the Order. It ariſes from this, that the Operations of Huſbandry are not limitted to one Time, or one Uſe, but the ſame Procedure anſwers ſeveral Purpoſes, and is equally proper at different Times.

Rolling is perform'd, on ſome Occaſions, before the Seed is ſown, and on others, after that Operation. In the firſt Caſe it ſerves like the other Practices for that Time, to break and divide the Ground; and in the other to deſtroy Vermin, to fix the Earth to the Roots of the Plants, and to prepare the Surface of the Ground for the Scythe. 'Tis the ſame with harrowing, which ſerves in one Caſe to break and prepare the Land for the Seed, and in the other to cover it. We might therefore have introduced this Article of ſowing before, or after, thoſe Operations; but we have choſen to introduce it afterwards, becauſe thoſe ſeveral Articles being now diſpatched, there will be nothing to break in upon the Courſe of our Method, when we proceed from the ordinary Manners of ſowing, to that excellent and great Improvement made by what is called the Drill Huſbandry, which naturally leads to the Article of Horſehoeing, and thence to the cutting and carrying in of the Crop, according to the propoſed Method in our Plan.

We have been very particular in cautioning the Farmer, when he is about to raiſe a Plantation, to chuſe properly his Seeds of the Trees; there certainly is as much Cauſe to be careful in the Choice of thoſe, for his Arable Land: and many of the ſame Cautions hold good with Reſpect to both, wherefore we refer the Reader for many Things, to that Part of our Work, that we may avoid Repetitions.

The firſt Conſideration in this Reſpect is the Kind and Soundneſs of the Seed, concerning which we ſhall give proper Directions, as alſo for the ſteeping it to promote and encourage its Growth; we are here diſtinctly to conſider the Article of Sowing.

Let the Seed be had from another Land, not the Farmer's own, on which it is to be ſown again; and it will be beſt if, with a proper Degree of Goodneſs, it have grown upon a worſe Land than that whereon he is to ſow it.

Even where the Seed is no Way different, and the Nature of the Land the ſame, it is often found of great Advantage to change it. Thus two Farmers at forty or fifty Miles diſtance, ſhall mutually find Advantage in ſowing each on his Land the Corn that grows upon the other's.

The Seed from a colder Climate ſucceeds beſt upon the Land that lies in a ſomewhat warmer. The English Farmer will be ſure to find his Advantage, if he will get from the Northern Counties his Seed for the Southern: this is the ſame Kind of Benefit with that of ſowing Seed from a poorer on a richer Ground: the favourable Climate advances it beyond its natural Goodneſs.

When it is a dry Soil that is to be ſown, wet Weather ſhould be choſen, if the Seed be of a Nature to bear wet; on the contrary, in moiſt Lands a dryer Seaſon is to be prefer'd.

Let the Farmer ſow Wheat in wet Weather. It never is too wet for this Purpoſe, when the Horſes and Inſtruments can go without clogging. On the contrary, let him always ſow Rye in the dryeſt Seaſons, Rye will come up at its proper Time, without Rain; but Wheat, if ſown in a dry Seaſon, will be ſix Weeks, or more, before it appears, if there fall no Rains afterward.

In general Summer Corn does beſt when ſown in dry Weather. Only black Oats are an Objection to this Rule, for they require a great deal of Moiſture, and will not do well without it.

Wheat not only will lie without ſhooting, when the Seaſon is dry, at and after the Time of ſowing it; but in this Caſe a great deal of it will be loſt: for while it lies and does not grow, it will be in danger of decaying. Therefore it is better for the Farmer to wait ſomewhat beyond the common Seaſon, than to ſow his Wheat when it is ſo likely to fail.

As to the Manner of ſowing, it differs on many Occaſions, and is accordingly expreſſed by the Huſbandman under a Variety of Names. What they call ſowing under Furrow, is ſowing the Corn in the Furrow, and plowing a Ridge over it to cover it; ſometimes they harrow the Land, and ſow Wheat or Rye upon it with a broad Caſt, ſome only with a ſingle, and ſome with a double Caſt, and then plow it upon an Edge in broad Lands, when the Land is dry. Some alſo plow their Land up an Edge for broad Furrows, and ſow their Wheat or Rye on it, and then harrow it over. In ſtrong and tough Lands the ſuperficial Methods are beſt, and the Method of ſowing under Furrow is beſt in lighter and looſer Soils: but all theſe, and the other Methods of ſowing at Random in this Manner, are very imperfect, and therefore leſs need be ſaid about them. Their Imperfection leads us naturally to that excellent Method the Drill Huſbandry, by which every thing wrong in the uſual Way of Management is ſet right; and this we ſhall, according to its Merit, treat of at large,

introducing it to the Reader by thoſe Reaſons on which it is founded, and thoſe Experiments which ſupport them.

CHAP. XLIV.

Of the Depth at which Seeds are to be ſown.

WE ſee that in the Methods already mentioned, the Corn is ſown quite at Random. It is ſcattered in an irregular Manner, and without any Precaution, and cover'd afterwards to an uncertain Depth. It is plain that Irregularity and Uncertainty never can be for the Advantage of any thing, and they ſhould not be admitted in Matters of this Importance.

Certainly Corn will grow from one Depth better than from another, and the more regularly it is ſown the better it will riſe. The Intent of the Drill Huſbandry is to diſtribute it properly, and to cover it in ſuch Manner as beſt ſuits its growing, and this not according to Gueſs, but upon Experience.

All Kinds of Plants are not to be ſown at the ſame Depth, ſome requiring more Moiſture and more Shelter than others, while they lie in the Ground; and ſome rot at thoſe Depths at which others will grow beſt.

To be aſſured more perfectly of this, the following Experiment may be made. Let a Trench be cut of two Foot long, and at one End let it be two Foot deep, and at the other terminate at the level of the Ground, the Bottom all the Way riſing in a ſlanting Direction. On the Bottom of this Trench, all the Way up, let there be ſcatter'd Seeds of different Kinds, and then let the Earth that was dug out be thrown lightly in again, covering the Seeds every where, and filling the Trench up to the Level of the Ground.

It will be found, by this Experiment, that none of all the Seeds which the Farmer has to do with, will riſe when they are buried at more than nine Inches Depth. At ſix Inches ſome Kinds will riſe very well, and other Kinds ſcatter'd with them not at all; and other Seeds do not ſhoot, unleſs they be within an Inch or two of the Surface.

This is a plain Experiment, and there can be no Error about it.

Experiments of the ſame Kind will alſo ſhew, that Seeds of the ſame Species may be buried at a greater Depth in light, than they may in ſtrong Soils. And they will ſhew farther, that certain Seaſons favour the ſhooting of Seeds more than others.

We find that Warmth and Moiſture are the great Articles for promoting the Growth of Seeds. The ſame Kind of Seed, buried at a Depth ſomewhat too great, will ſhoot and ſucceed if the Seaſon prove favourable on theſe two Accounts, which if the Weather had been dry, eſpecially if cold, would have lain there without growing.

In ſome Caſes Seeds will corrupt and grow mouldy, when they are covered too deep for their Shooting; but this is not univerſal. Experience ſhews that they will lie unhurt in this Manner, in ſome Soils, twenty Years: ſo that on turning up the Earth after that Period, and bringing them nearer the Surface, they grow ſpeedily and well.

It ſeems, that in ſome Inſtances, the Seeds of Plants will lie longer than this, for in many Parts of the Iſle of Ely, they never turn up the Earth in a Ditch Bank, but there grows Muſtard upon it, although there were none before upon the Ground, or even in the Neighbourhood of the Place. The ſame Thing I have obſerved about Chelsea, with Reſpect of the Plant call'd Eryſinum, or Hedge Muſtard. This never fails to ſhoot where the Soil has been open'd to about two Foot depth. Unqueſtionably therefore the Seeds of theſe Plants have long ſince, by ſome Accident, been buried in the Earth in theſe Places, and they keep good there till remov'd nearer the Surface, though they lie too deep for ſhooting. Air is an immediate Neceſſary to the Growth of Seeds; it is more required to ſome than others, and none will grow unleſs it can operate in a Degree ſuited to its Purpoſe.

The Huſbandman who underſtands thus much of the Nature of Seeds, will find that he may preſerve any Kind for a long Time good, by burying it in a proper Manner; and he will find, to his more immediate Uſe, that every Seed has a particular Depth, in a moderate Soil, at which it grows beſt. He muſt in his Practice conform to this Knowledge, varying a little according to the Nature of his Soil, ſowing a little deeper than the exact Rule in very light Ground, and not quite ſo deep in ſuch as is very tough and ſtrong. He will ſee the Reaſon of this in the Account before given; for the Air certainly has a greater Effect at the ſame Depths in lighter, than it has in heavier Soils.

When the Farmer has thus much general Knowledge with Reſpect to Seeds, let him come to the particular Conſideration of the ſeveral Kinds, and examine what Depth of Covering agrees beſt with each.

To this Purpoſe Mr. Tull has propoſed the Uſe of what he calls Gauges, and they will determine the Matter with Reſpect to every Kind of Seed, with the moſt perfect Exactneſs.

CHAP. XLV.

The Practical Method of finding the proper Depth for Seeds.

A SEED is to be ſown at that Depth at which it will come up the moſt favourably: every Seed has its particular Depth for a moderate Soil, which is to be encreaſed a little in a lighter, and a little diminiſhed in a tougher Ground, and this is the whole Conſideration. When a Seed is ſown at a leſs Depth than this it is dried up, when at a greater it is buried, if it be much leſs or much greater, it will not grow at all: and if but little on either Side, it will grow leſs perfectly and beneficially to the Farmer, in proportion to the Degree of his Error.

Mr. Tull's Gauges for determining the proper Depth, are made in this Manner. Saw off twelve Sticks, of three Inches Diameter; and bore

bore a Hole in each Stick, and drive into the Hole a taper Peg. Let the firſt Peg be half an Inch long, the next an Inch, and ſo on; every Peg being half an Inch longer than the former, ſo that the laſt Peg will be ſix Inches long.

When the Gauges are thus prepared, dig up well a Piece of Ground on the Land where the Crop is to grow. We may make ſome Gauges longer than thoſe here mentioned, if it were done for Curioſity, and for the Trial of many Kinds of Seeds, as in the Trench before-mentioned; but theſe are fully ſufficient for all uſeful Purpoſes to the Farmer, and we now write ſolely with that View.

When this Piece of Ground is dug and well broken and divided, let the Surface be laid even, and let the Farmer make twenty Holes with his half Inch Gauge in a Row, drawing a Packthread Line acroſs the Piece of Ground for that Purpoſe. Let him have ſome choice Seeds, and put twenty of them in the twenty Holes. This done let him cover them up, without raiſing the Earth over them; and ſtick down the Gauge at the End of the Row. The Seeds will be thus buried half an Inch deep, and no more, and the Gauge being left will be a Rule to know it.

In the ſame Manner let him uſe the other eleven Gauges, and after making twenty Holes with each, and putting twenty Seeds in them, let him cover them up, ſticking the Gauge at the End of the Row, and wait the Event.

He will ſee which come up firſt, which grow beſt, and which do not ſhew themſelves at all. From obſerving which Depth anſwers beſt to that particular Seed, he will ſee what is the proper Depth for ſowing it in his Field: and this is the Foundation of the Drill Huſbandry. So ſimple and ſo rational is the Original of that excellent Improvement.

In this Manner let the Farmer try every ſeparate Seed before he ſows it, and thus knowing its proper and favourable Depth, let him ſet the Drill accordingly. Black Oats, when the Drill is ſet too deep, will ſcarce come up at all; and moſt Kinds, if ſowed too ſhallow, are vaſtly injured; a great Part of the Seeds not ſticking root, and thoſe which do, growing in general but poorly.

In general the Danger of ſowing in Winter is, the letting in the Seeds too deep, as in the Summer it is the ſetting them too ſhallow: and in tough Grounds the great Caution is to be us'd againſt going too deep; as in the ſoft and tender Soils, it is moſt likely to err in ſetting them too ſhallow.

The Farmer who tries the Seed with his Gauges upon the Ground where the Crop is to grow, makes himſelf the moſt ſecure that can be: and as he can, by properly ſetting his Drill, be ſure to let all the Seed for his Crop in at the ſame Depth, he will not fail of Succeſs, according to his Pains and Care.

It is beſt to repeat this Method for every Field; but he who wiſhes to ſpare himſelf that Trouble, when he thus knows by Experience the proper Depth in one Place, may vary a little in others, according as they are tougher or lighter Soils.

There is a farther Advantage attending this Practice of ſetting the Seeds by the Gauges, for it ſerves to inform the Farmer exactly of the Goodneſs of his Seed. This is a very important Point, and very difficult to be determined with any Degree of Certainty: Seed Corn may have Faults that eſcape the Eye, and will not be diſcovered by any of the common Methods of Trial. If it be good there is no Reaſon he ſhould ſow more than the neceſſary Quantity, for that is all the Price thrown away, beſide overloading the Ground; and if it be indifferent it is fit he ſow the more of it, elſe he will be defrauded of his Crop. He will know what he is to do from the Succeſs of the Seeds ſet by his Gauge.

He will find the Depths at which they will come up, and mark that at which they ſucceed beſt, and this is to be his Rule. Thoſe Seeds which riſe from the greateſt Depths, are not to be ſown at the loweſt they will bear, eſpecially Wheat, in a Land that has a damp Bottom; for in this Caſe the wet will chill the firſt Roots, which are very tender, and by that Means check the Growth of the Plants: now the Farmer's Buſineſs is not only that the Seeds ſhould ſhoot, but that they ſhould grow well.

Some Differences alſo, with Reſpect to the exact Depths, there are to be obſerved according to the Nature of the Land, as before obſerved, and according to the Manner in which it is laid, whether that be flat or in Ridges, as alſo with Reſpect to the Seaſon of ſowing. In all theſe the Farmer's Reaſon and Judgment are to be his Guides, no general Rule can ſuit every particular Circumſtance that may happen. The Method of giving Directions uſefully, is to lay them down in a middle Way; ſuppoſing the Soil, the Seaſon, and all other Accidents, moderate, neither particularly right, nor particularly unfavourable. This is the Courſe which we have taken. Having added to this the Reaſons that ſhall induce the practical Reader to make the needful Differences, he will ſee in what Caſes he is to vary from the preciſe Rule, and in what Manner; but as to the Degree of differing, that muſt be left to his own Prudence, directed by the Nature of the Circumſtance in his particular Caſe. Farther than this no general Rule can go.

We have every where laid down the beſt Precepts that Experience can furniſh to the Farmer, but we no where demand or adviſe his punctual or exact Adherence to them. The proper End of writing is not to take away the Neceſſity of thinking in thoſe who read, but to lead them to think, and diſpoſe them into a proper Road of doing it to Advantage. Thus, in the preſent Work, we deliver firſt the Reaſons of what we are about to adviſe: and we afterwards give the Directions with as much Care and Punctuality as we are able: but when the Farmer has underſtood the one, and conſider'd the other, let him put them in Practice, according to the Situation, Nature, and Circumſtances of his own Affairs, and of the Land he tills.

CHAP.

CHAP. XLVI.

Of the Quantity of Seed to be ſown in the Common and Drill Huſbandry.

WE have conſidered the Depth at which Seeds are to be ſown, and we have occaſionally mentioned the Differences that may be neceſſary to be regarded in their Quantity, according to their Goodneſs or Degree of Faults: but there remains a very important Queſtion yet to be determined with Reſpect to ſowing, which is, the Quantity of Seed that in any Kind is needful for a certain Quantity of Ground.

This is of great Concern to the Farmer in the firſt Place, becauſe the Price of the Seed in ſome Kinds is a very conſiderable Article, and in the next, becauſe he may hurt his Harveſt, either by ſowing on the Ground a ſmaller Quantity than it would be able to maintain, or a greater. We now come to enquire into the proper Proportion, and ſhall endeavour to guard equally againſt Exceſs and Defect.

It is only according to the new Method of Huſbandry that this can be done, becauſe the new Huſbandry alone is perform'd by Rule: according to the old Methods every thing was left to Uncertainty.

In the uſual Way of ſowing by Hand for Inſtance, according to which ever of the beforementioned Methods it was done, there muſt unavoidably be the greateſt Uncertainty. For one Man's Hand will be larger than another's, and therefore capable of containing more; and yet the Handful is a Handful among the Farmers in ſowing; as the Finger is half a Quarter of a Yard with the Women in meaſuring, whether it be longer or ſhorter.

Beſide this the Seed or Grain of the ſame Kind will be ſometimes larger, and ſometimes ſmaller, and this will make a very great Difference in the Number of Grains in a handful, and the Number is the only proper Conſideration in the Article of ſowing.

Another Inconvenience of ſowing in the common Way by hand is, that if the Field be but indifferently tilled, as is too apt to be the Caſe, ſo that the Earth lie in Clods, and make the Surface conſiſt of Hills and Holes; the Seed Corn, though ſcattered ever ſo equally from the Hand of the Sower, will run off the Surface of theſe Clods and Hills into the Holes; ſo that it will lie on the Field in general very unequally: and in the ſame Manner the Crop will riſe in Cluſters in ſome Places, and defective in others. This is a miſerable Fault, yet it is natural, and according to the common Manner of ſowing univerſal. Thus certain Spots where the Corn riſes, are not able to ſupport ſo many Plants as grow on them, and others are vacant which would very well have fed the Surpluſs. The Benefits of the Field are thus as unequally diſtributed among its Growths, as thoſe of Fortune among Mankind, there is enough for all if it were properly diſtributed, but Millions ſtarve becauſe it is divided unequally.

This is unavoidable in the common Method of ſowing, but it is perfectly remedied in the Drill-Huſbandry. The Corn there is ſpread in the Seed juſt as intended, and the Spaces of Ground left vacant are not left ſo at Random, but juſt as they may be moſt uſeful.

A larger Quantity of Seed than is abſolutely needful for the Growth, is alſo neceſſary to be employed in the common Way of ſowing, becauſe ſome of it will be buried too deep, and therefore never ſhoot; and ſome will be left too near the Surface, and therefore will ſhoot very unſucceſsfully. A great deal of that which lies too naked will be alſo eaten by Birds, and other Devourers; ſo that upon all theſe Conſiderations, Reaſon preſcribes to him who will ſow his Grain by Hand in the uſual random Way, that he allow a great deal more than would be abſolutely neceſſary to the Growth.

This is a great Expence if he allows it, and he defrauds himſelf if he denies it; and at beſt the whole is an Uncertainty. We ſhall teach him, by following the Drill Huſbandry in a right Way, to ſave this unneceſſary Charge, always to ſupply his Ground properly, and always to diſtribute his Seed equally.

His Field ſhall have juſt as many Plants on it as it can ſupport, and theſe ſhall have the Advantage of every Particle of his Soil. This is all that can be wiſh'd: this never can be attain'd in the uſual Way of our old Farmers; but however great a Thing it may ſeem to promiſe, it will be perfectly fulfilled by the Drill Huſbandry.

The Seed by this Method is let into Trenches; theſe Trenches are cut at any Diſtance that is found beſt, and the Seed is cover'd in them exactly ſo deep as it has before been found to require for its moſt free and perfect Growth.

As this covering up of the Seeds is not done in an uncertain Way as by the Harrow, but with a perfect Regularity, every Seed is ſure to be cover'd, ſo that none is devour'd by Birds. And finally, the Inſtrument lodges in each Trench exactly the Quantity of Seed that is proper, and no more.

By Means of the Drill the Seeds of all Kinds are lodged in the Earth at proper Depths for their Growth, and out of the Way of Inſects in a great Meaſure, for the greateſt Devourers of this Kind prey near the Surface. The few who creep to any Depth, and devour Seeds, are the Sources of the only Accident to which thoſe ſown in this Manner can be liable; ſo that we may, with this ſmall Exception, provided the Seed have been good, anſwer for the Growth of every Grain.

Here is ſeen the great Neceſſity of that Caution we have before directed the Farmer to uſe in the Choice of his Seed Corn. As the Drill diſtributes only ſo much as is neceſſary, and no more, the utmoſt Care ſhould be taken that this be all good: for by ſo much of it as is naught, by juſt ſo much will the Quantity be too little for the Ground.

Here the ſowing by the Gauge comes into the Farmer's Aſſiſtance.

He has bought his Seed Corn, and he has ſown twenty Grains of it in twenty Holes, and cover'd them equally. They have all the ſame Advantages, let him ſee whether they all come up, or how many are wanting. This will ſhew him the

Value of his Seed: and let him proportion the Quantity he ſows accordingly; allowing ſo much more than what he need to have done if all were good, as will allow for the Defects at that Account.

We do not pretend that this is a punctually exact Rule; for out of every twenty Grains there will not be juſt the ſame Number of good and the ſame of bad; but it comes as near as any Rule in theſe Caſes can do; and what is more to the practical Reader's Purpoſe, it comes as near as it need.

We have obſerved, that the Drill Huſbandry diſpoſes the Seeds in Rows; and the Inſtruments are ſo formed as to ſuit this Practice to the ſeveral Occaſions, according to the Nature of the Plant that is to be rais'd. Thus ſome are diſpoſed in ſingle Rows, ſome in double, in ſome three or four Rows are ſet together. Between theſe Rows there are Spaces of ſix, ſeven, or eight Inches; where there are ſeveral of them; and there are larger Intervals between one Set of Rows, and another Set in this Caſe, and between the ſingle Rows, when they are ſown ſingle.

It will be found by all theſe Trials, that ſuppoſing the Seed of equal Goodneſs, a great deal leſs is requir'd in the Drill Huſbandry than in the common Way. This is not to lead the Reader to ſuppoſe, that ſo many Plants will not be ſupported upon the ſame Ground this Way as the other; indeed a great many more will ripen thus than in the common Method: and this, becauſe of the Regularity with which the Plants grow in this Method; for by the other the Wind will diſpoſe it differently, if it be ever ſo evenly thrown from the Hand; or the Harrow will draw it irregularly in Cluſters in ſome Places from others: beſide thoſe other Diſadvantages we have named from the Irregularity of the Ground. In theſe Cluſters, though many Plants riſe, few come to good, and the vacant Spaces are uſeleſs, becauſe they cannot be tilled while the Crop is growing.

In the other Way the Corn grows regularly, therefore one Stalk does not ſtarve another; and the vacant Spaces being left regularly, are capable of being tilled while the Crop is growing, which is a prodigious Advantage.

Thus it is evident a Piece of Land will ſupport more Plants, when they are thus ſet in a regular Manner, than it can when they are ſcatter'd in a random Way; and that if it raiſe fewer, yet theſe, from the great Perfection in their Growth, produce more in their Kind, becauſe they are better ſupplied with Nouriſhment; for in this Huſbandry every Particle of the Ground is made to ſerve the Plants for their Nouriſhment, as well that which ſupports their Roots immediately, as that which is left vacant between them.

Let the Farmer underſtand this Matter perfectly, for on it depends the Principle of this new Species of Huſbandry. This is a Fact, that fifty Seeds laid together in a Hole in the Place of one, will not produce ſo much as that one, when planted as it ſhould be, and properly nouriſhed. The Number ſtarve one another, and not one of them all come to good: on the contrary, a ſingle Grain of good Wheat, properly ſown and encouraged by tilling the Earth about its Roots while it is growing, will yield a Quantity of Seed at Harveſt Time, greater than we dare mention to thoſe who have not try'd ſuch Experiments. In the common Way a great deal of the Seed is buried without all Hope of Recovery, and a great deal is loſt by various Accidents, as ſaid already, from the other Extream.

The Huſbandmen have never examined, with any Degree of Exactneſs, what is the proper Quantity of Seed for Land; nor do they make any Difference, at leaſt not any great Difference between the Quantity for an Acre of rich, and that for an Acre of poor Ground; though without Queſtion, that Quantity which would be too little for one, would be found too much by a great deal for the other.

It is to no Purpoſe to over-load a poor Soil; nor is there any Practice by which the Farmer more defrauds himſelf, than by not allowing Plants enough to a rich Ground.

CHAP. XLVII.

The Practice in Reſpect of Quantity in different Places.

IN ſome of our Weſtern Counties the Farmers ſow eight Buſhels of Barley on an Acre of Ground. They do not, in this Caſe, conſider the Nature of the Soil, or proportion the Quantity of Seed to it. If it be poor they give it the more Dung; if rich the leſs will ſerve; and in either Caſe the Quantity of Seed is the ſame.

Their common Practice there is to plow the Land only once, then they double dung it, and after this the Seed is ſcatter'd in the random Way by Hand, and harrowed into the Ground.

As the Land has now lain ſome time after the plowing, and is grown hard, the Harrow takes but a poor Effect. In all Probability three fourths of the Seed never gets into the Ground, ſo as to grow.

This is their Practice, and the Event is anſwerable to ſuch a Conduct. If the Summer prove dry, the Harveſt ſometimes will not yield half the Quantity of Corn that was ſown: in the moſt favourable Seaſons they ſeldom get above four Quarters to the Acre. This is a miſerable Encreaſe; but they go on ſatisfied: labour is cheap, and they live hard: and ſo they live at all they are contented. What a prodigious Difference is there between this, and the Huſbandry of the new Method. In that the Seed all lies at the ſame Depth, and that is the very Depth Experience has ſhewn to be the moſt favourable to its Growth: none is buried, none is expoſed; therefore no Allowance in the Quantity, is to be made upon thoſe Conſiderations. But as the Fly will damage ſome Seeds, and Froſts may hurt others, a proper Allowance is to be made on thoſe Accounts, and on no other.

Before the Farmer determines his Quantity by the Buſhel or the Pound, as is the common Way, let him examine its Size, for a great many more Seeds will go to the ſame Weight, or the ſame Meaſure, when they are ſmaller, than are requir'd

when they are larger. This will deceive in ſowing by the Drill, as well as by the Hand, if Care be not taken accordingly.

To be ſecure in this Reſpect, let the Farmer weigh an Ounce of the Seed, and count the Number of Grains in that Quantity; then let him weigh a Buſhel, and computing by the Number in the Ounce, he will come near enough to the Number that contains. When the Number of Seeds in a Buſhel is thus obtain'd, they may be portioned by the Rule of Three, to the ſquare Feet in an Acre.

A Standard being firſt eſtabliſhed, upon the before-mentioned Principles, this is a certain Method of giving the right Portion of Seed to any Quantity of Ground. But in this the Farmer is alſo to conſider, at what Diſtance he intends the Rows ſhall ſtand; if he deſigns to plant in ſingle Rows, he is only to conſider what he intends to be the Meaſure of the Intervals; if he deſign in double, treble, or more numerous Rows, he is to compute what will be the Space of his Partitions, as well as of his Intervals; for the more Rows are planted in an Acre, the more Seed will be required.

When the Farmer has thus far conducted himſelf according to Reaſon, not blindly following Cuſtom, let him go a little farther in this rational Way of Computation.

Let him now examine what is the Produce of one middle ſized Plant of the annual Kind; and what is the Produce of the beſt and largeſt of the perennial; for he may aſſure himſelf that a Plant of the perennial Kind will never fail of being brought to this its utmoſt Degree of Perfection by the Drill Huſbandry, connected, as it naturally is, and always ſhould be, in Practice with the Horſehoeing Method.

In all Caſes let the Quantity of Seed, according to the preceding Directions for Computation, be proportioned to the reaſonable Product. Perennials are beſt planted, in general, in ſingle Rows; and moſt of the annual Kinds do beſt in multiplied Rows, two, three, or more, according to their Nature; but in general the beſt Procedure for their Growth to their utmoſt Profit, is in treble Rows, the Rows being ſeven Inches diſtant, and the Intervals between them five Foot.

In many Caſes it is worth while to go over the Ground ſoon after the Plants are come up, and thin them to a proper Number, leaving the moſt thriving. This ſuppoſes the uſing a little more Seed than is abſolutely neceſſary; but it is a very good Method.

In order to the Farmer's being ſet perfectly right in that great Article the Quantity of Seed, let him ſet ſome Rows of the annual Kind thicker than others, and ſee in the End whether they anſwer better or worſe than the reſt.

This is ſending him to his own Experience for his Guide, which is the Courſe we have followed throughout this Work. No Direction is ſo certain; and the beſt Office we can do him is to direct his Experience into the proper Courſe.

CHAP. XLVIII.

Of the Advantages the Drill Huſbandry receives from the Hoe Plow.

TO be more particular on this important Head; Reaſon dictates that the Drill ought to diſtribute more or leſs Seed; or in more expreſs Words, a greater or a ſmaller Number of Seeds in each Trench, in proportion to the Nature of the Plant. This is certainly right: let us ſee then how we can come at the Knowledge on which this Regulation is to depend.

The Nature of the Plant ought to direct in general at what Diſtance the Seeds ſhould be lodged in the Trenches; for this will be in a tolerably regular Manner effected by the Quantity allowed to the Inſtrument: as will be ſeen when we ſpeak of its Structure. Now to determine this, let us obſerve what Space a healthy and vigorous Plant of that Kind, which we are about to ſow, occupies in its natural Growth: when we know this in a tolerable exact Way, we are ſo to fit the Drill that it ſhall leave ſuch a Space between Seed and Seed, ſuppoſing all to be good; or a proportioned Space according to the Degree of their Faults.

We ſhall be ſurpriſed at firſt Sight to ſee a Piece of Land ſown by the Drill, and intended to be horſehoed, becauſe of the great Quantity of vacant Space. We take this at firſt to be unoccupied Land; but in this we err, for on obſerving the Growth of the Plants in the Rows, we ſhall ſee they acquire a Perfection vaſtly greater than thoſe of the ſame Kinds in the common Method of raiſing them; and this is altogether owing to thoſe Spaces. Theſe Intervals we find therefore do, in reality, furniſh the Plants in the Rows with Nouriſhment, tho' at firſt we thought otherwiſe.

In this new Huſbandry we find, at Harveſt Time, that every ſingle Grain of Wheat that has grown well, has produced from twenty to thirty Stalks; whereas, in the common Way of Huſbandry, each Grain generally produces only two or three Stalks. Now if theſe twenty or thirty additional Stalks from each Grain were diſtributed equally in the Intervals, the whole Ground would appear well covered. They are nouriſhed as well in the Rows, as they would be if thus diſtributed along the vacant Ground; therefore whatever be the Appearance, the Effect is equal.

We have counted the Stalks; let us next examine the Ears. Every one of theſe will be found larger and better filled than in the common Way. Therefore as the Number of Stalks made the Growth equal, the Goodneſs of the Ear will make the Produce richer, and the Harveſt more abundant.

This is very plain Reaſoning: it is abſolute Fact, therefore why ſhould not the Farmer receive it as ſuch, and form his Practice accordingly.

In the common random Way of ſowing, the Ground ſeems well covered with Plants, but as all this Number cannot naturally find ſufficient Nouriſhment in the Ground, and it is

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in this Way impoſſible to ſupply them better by Means of Tillage, after they are riſen; it follows in Fact, as Reaſon muſt foreſee it would, that a great many of the Plants abſolutely die, and many of the others become ſickly and weak, none ever wearing that healthy Aſpect which is ſeen in thoſe of the other raiſing.

In this new Way all the Plants are healthy and ſtrong, and they are ſupplied, from time to time, with Nouriſhment, by Tillage of the vacant Land between. Their Roots ſpread into that Land, and they are nouriſhed by dividing it. The Strength and rich Produce of theſe, though few in Proportion, might therefore very well make up for the Number of the other ſmall languiſhing and half-nouriſhed Plants. Facts eſtabliſh the Truth of this Account; for upon the faireſt Tryals, and thoſe frequently repeated, it has been found, that of two Pieces of the ſame Land, equal in Size, and alike in every natural Reſpect, the one being cultivated in the old and common Way, and the other ſowed by the Drill, and horſehoed in the Intervals, the Produce of that managed according to the new Method, has been three, four, and ſometimes five Times as great as that of the other.

The Benefit of dreſſing the Land by Tillage, frequently while the Crop is growing, is not confined to the preſent Growth, it extends to the very Hedges. A Hedge of white Thorn that parts two Fields which are dreſs'd in this Manner, will grow four times as faſt as one of the ſame Kind in another Place, and in an equal Number of Years will yield four times as much Wood as the other. This Account has been carried much farther, and perhaps with Truth in other Places, I write what I have ſeen.

This can be owing to nothing but the Advantage there is in ſtirring the Ground. And it is a Proof that this frequent ſtirring is of the utmoſt Benefit to every Growth.

In theſe Hedges, which are within the Reach of this Tillage, the Branches not only grow ſooner to a good Size, but there are more of them. It is exactly the ſame Caſe as with the Corn which we have obſerved riſes with vaſtly more numerous Stalks; and this, beſide ſhewing abundantly the real and great Uſe of this Practice, points out the Advantage it may have beyond the common Uſe of it in Reſpect of Corn.

It is natural to ſay, that Plowing about the Roots of the Hedges muſt cut off a great many of them; and in Effect it does ſo; and it does the ſame with Regard to the Corn, for however little we may, at firſt Thought, imagine it, 'tis certain that the Roots of theſe Rows of Corn do at firſt ſpread themſelves into a great Part of the five Foot Intervals, and by the Aſſiſtance of the Hoe entirely. It is true that the Inſtrument does cut the Roots of the Corn, and of the Shrubs in the Hedge, and that equally; but from this Cutting there reſults nothing but Advantage. The Roots of Trees are like the imaginary Hydra, or the real Polype, they grow the more for cutting; and what is very advantageous, theſe new ones are more proper to draw Nouriſhment than the old. When a Root, whether of Tree or Plant, is cut off, a Number of new ones are produced from it if it be cover'd by Earth, and if that Earth be newly dug they ſpread the more freely and the farther. Thus this cuting of the Roots, in the breaking of the Ground, inſtead of doing any Harm does the greateſt Good, it gives the Plant a thouſand new Mouths to feed by, and it ſpreads Food before them all.

Thus much it has appeared proper to ſay in this Place, with Reſpect to the great Produce of Wheat and other Corn in the Drill Huſbandry, and the principal Cauſe to which it is owing. There are thoſe who drill their Seeds without uſing the Hoe Plow, or leaving Intervals for it, and they ſucceed better than thoſe who follow the old Way entirely; but the two Methods are naturally connected, and they ſhould not be ſeparated. We ſee it is to the Effect of the horſehoeing in the Intervals, that the vaſt Increaſe from the Drill Huſbandry proceeds; and that we have naturally been led to ſay here, will prepare the Reader for that Syſtem which we ſhall, in the ſucceeding Chapters, have Occaſion to treat of in a more particular Manner.

CHAP. XLIX.

Of changing the Seed.

WE have mentioned, under the Article of ſowing, a Thing which it is neceſſary to ſpeak of more largely here; this is, the changeing the Seed, or the ſowing upon a Piece of Land the Seed which has grown in another Place, rather than what has been obtained from its own Crop. We there mentioned the Fact that it is found to be a right Practice, we ſhall here enquire into the Reaſons which ſupport that Practice.

Cuſtom ſpeaks very ſtrongly for the Thing itſelf, and that a Cuſtom not of one Time or Country, but of every Place we know, and of all Times of which we have Account. Flax ripens its Seed very well here, but we import it from FLANDERS for ſowing; and in FRANCE, where every thing in many Places particularly favours the Growth of that Herb, we find they ſtill import their Seed from the ſame Place whence we have it. Our People aſſert, that when they have ventured to ſow the Seed of their own Growth, they have but poor Advantages, compared with thoſe from the Foreign; and the FRENCH, with one Voice, ſay the ſame.

In the ſame Manner many other Seeds are conſtantly imported from different Countries, though they ripen very favourably with us here in the ſame Kinds, and the ſame Advantage is found. Our Farmers from Year to Year, in many Places, change their Seed Corn, and that of other Growths, and they ſay they find the ſame Benefit. If there were no apparent Reaſon for ſuch a Practice, the conſtant Succeſs ſo well ſupported by Evidence, would be ſufficient to engage the prudent Farmer to adhere to it. But there are not wanting Reaſons which explain it; and we ſhall propoſe them to our Farmer, that being inſtructed in the Nature of this Benefit, he may the more firmly ſtick to the Practice which procures it.

In the firſt Place, with reſpect to the conſtantly importing the Seed of certain Plants from particular Countries, there may be this plain Reaſon for the Advantage ariſing from it, that certain Plants thrive better in ſome Climates than in others, and in ſome particular Countries. Where they thrive beſt they will ripen their Seed more perfectly, for that is the great End of their Growth; and many Plants will do this much better in their native Country, than in any other; though they ſeem to agree very well with many others.

A Plant that does not thrive perfectly, will not yield perfect Seeds, and Seeds that are not perfect will not give Plants that are. This is a plain Reaſon why thoſe Plants may be poor which are rais'd from Seeds gathered in a Climate that was not natural to the Kind; and that thoſe may be perfect and fine, though raiſed in another County, that are obtained from Seeds gathered in its own. Every Plant has its Country, and there is this Reaſon for finding where that is. We thus not only ſee the real Benefit that follows this Practice explained, but we are directed to puſh it much farther, and may thereby improve many other Kinds.

Beſide this Difference ariſing from the Climate in which the Seeds have grown, it is evident that they may be altered by the Nature of the Soil in the ſame Country, and that they will be much better having been rais'd on one Kind of Land, than on another. In a poor Soil the Plants grow weak and low, they languiſh as they ſtand, and it is very natural to conclude, that as the Plants are altogether weak, the Seeds are ſo too. Imperfect Plants are not likely to produce perfect Seeds. There is great Reaſon to think the Seeds of ſuch are ſtarved. Plants will not produce ſuch vigorous and good ones, as thoſe would which ſhould be collected from vigorous Plants of the ſame Kind in the ſame Country.

We have been very careful in our Directions to the Farmer about Trees, to chuſe the Seed cautiouſly himſelf, not to get it by Purchaſe. We have adviſed him, on every Occaſion, to gather it from a lively and well-growing Tree. This is founded on Experience, for every Nurſeryman knows, that the Seeds from poor Trees produce poor ones again. As this is a Fact in the larger Productions of this Kind, why ſhould it be doubted in the ſmaller: certainly it is as true of one as the other.

On this Principle Mr. Tull adviſes, that the Seed for any Piece of Ground ſhould be got from a Land ſomewhat richer than itſelf, and from one that is well cultivated. This ſeems to contradict the Doctrine of removing Trees from a poorer Soil to a richer in Nurſeries, and it might well be retorted upon us here, that this Rule ought to hold parallel in one Inſtance as well as another. This ſeems an Argument, and we are aware alſo that the Opinion of many is againſt that we have adopted in this Place; but upon the whole Conſideration it appears, that what this Author adviſes is right. 'Tis the firſt Shoot only that is regarded in Corn, for that is an annual Plant: this is certain to be ſtronger and bolder, from a ſtronger Seed: and this is all the Concern.

From theſe Obſervations the Farmer will eaſily gather the Reaſons for getting his Seed Corn from a better Soil than his own; but we have obſerved, under the Article of ſowing, that it is adviſeable for him to change it merely for the Sake of changing; and in fine theſe, or any ſuch Conſiderations, even this Practice, is not without its Foundation in Reaſon; nor does it want plain Proofs of its Advantage.

Weeds are a great Trouble to the Farmer in his Corn Lands, and there are ſome which naturally love one Soil, and ſome another. The Seeds of ſome of theſe will be mixed among the Corn, and therefore, as they will be ſure to thrive on their favourite Soil, the Farmer when he ſows his own Corn upon the Ground again, lays in a Store of them with it. This is prevented by making an Exchange with another Farmer at ſome Diſtance, who cultivates a different Kind of Land; and there will therefore ariſe a great Benefit to both by the Exchange, ſuppoſing the Corn of each Ground exactly equal in Goodneſs.

Let us ſuppoſe one of theſe Farmers cultivates a light ſandy Soil, and the other a tough clayey one. The Seed Corn from the ſandy Soil is full of the Seeds of the Corn Marygold, and theſe being ſown on the ſame ſandy Ground, would produce that Weed innumerably; but being ſown on Clay they will come to little. In the ſame Manner the Seeds of thoſe Weeds which have a tough Clay, being ſown among the Seed Corn on a light ſandy Land, will ſeldom thrive. Thus ſuppoſing the Seed Corn to be of equal Value, each of the Farmers gets rid of a great Quantity of Weeds by ſowing the Corn rais'd by the other: there is no Diſadvantage attending the Crop itſelf, for Wheat is Wheat, whether it have grown on Clay or in Sand, and it will thrive in either if properly dreſs'd, ſo that the Advantage is certain, and there can be no Harm.

Mr. Tull looking upon this Intent of getting rid of Weeds, as the principal Objection to the ſowing Seed of the ſame Ground, infers, that this changing of Seed will not be neceſſary unleſs for the Sake of getting of better, or more cultivated Ground, becauſe this Method of Culture deſtroys Weeds ſo effectually. It is true that the Horſehoeing Huſbandry does deſtroy Weeds; but there is no Reaſon from this to ſay we need not change the Seed, for this Production of Weeds is not the only Miſchief that attends ſowing Corn of the ſame Growth.

We ſhall agree readily with Mr. Tull, that the Grain of Land cultivated by the Drill Plow and Horſehoe, is fairer and finer than that of other Ground; but we ſhall not, for that Reaſon, adviſe the Farmer to ſow it over and over again upon the ſame Piece of Ground; becauſe Cuſtom, ſupported by Experience, ſhews that it is better on many Accounts to change it; neither ſhall we adviſe the Farmer always to chuſe the fineſt looking and biggeſt Grain for Seed. It is a very material Circumſtance in the Drill Huſbandry, that the Seed be nearly of the ſame Size; but it is not needful that it be always large; for the Soundneſs is a more material Article. We find that very ſmall Wheat, provided it be ſound and well conditioned, will produce very large and fine

Plants;

Plants; and in this there is a plain Advantage to the Farmer, for it goes ſo much the farther in ſowing, as there are more Grains of it in the Meaſure of a Buſhel. It is the Number not the Quantity that he is to regard.

CHAP. L.

Of the ſuppoſed Change of Species, and of PATNEY *Barley.*

WE find that Plants of all Kinds degenerate on Soils that are not agreeable to their Natures: they languiſh or they are ſtarved in the ſame Manner, whether it be that the Climate, or that the Soil in the ſame Climate, make the Difference. The Imagination of one Plant's changing into another, becauſe of the Soil not agreeing with it, is idle and fooliſh. We no longer believe that Wheat can change into Rye, by the Badneſs of the Ground, nor any of the like Changes of Species; but what we ſee and know is, that a Plant which continues the ſame in Kind, will be worſe and worſe in Quality, as the Soil and Climate are leſs and leſs ſuited to give it Nouriſhment. This is what we mean by degenerating, and this is what really happens. A Grain of Wheat, however it be managed, will never produce any thing but a Stalk and Ear of Wheat; but when it is ſown on a good Soil, and well cultivated, it will raiſe a great Number of Stalks, all of which ſhall have full Ears; whereas, when it is rais'd upon a poor and uncultivated Ground, it ſhall have but one, and that worth nothing.

In the ſame Manner that REDI proved the Falſity of the Opinion of equivocal Generation, may any one prove that of the Opinion of Wheat degenerating into Rye, which is equally falſe, though it was at one Time as univerſally believed as the other.

In the firſt Inſtance People ſaw Maggots in Meat, as ſoon as it began to ſtink, and they ſuppoſed they were bred from the Meat. That ingenious Italian placed ſeveral Pieces of Meat to ſtink: ſome of them he ſet in open Veſſels, and others in ſuch as were covered with Gawſe, the Flies came to the open Pots, and laid their Eggs upon the Meat, from which Eggs came Maggots, and they turned to Flies like their Parents; but the Flies could not get at the Meat that was covered, ſo that corrupted as well as the other, but no Maggots bred in it. Hence it was plain, that the Maggots came from the Eggs of the Flies, and were not bred of themſelves in the Meat.

In the ſame Manner the Farmer ſows Wheat in his Field, and he ſees Rye amongſt it, he fancies that ſome of the Grains of Wheat which he ſowed, have produced Rye inſtead of their own Kind, and this is called degenerating from their Species: but the Truth is, there were Grains of Rye among the Wheat he ſowed; and there is no more Reaſon to wonder. Let him pick a Quantity of Grains of Wheat out of the Ear, and ſow them upon as bad Ground as he pleaſes, the Plants will be poor, but they will be all Wheat. There will be no Rye among them: and let him examine the Wheat he buys for Seed, in Places where he is uſed to ſee Rye grow among it, and he will find Grains of Rye in the Parcel. This is the whole Matter: and thus it is that moſt of the miraculous Accounts we meet with, come to nothing when we examine them with a due Attention.

The whole Caſe of the Degeneration of Seeds, when ſtrictly examined, amounts to this. The Seeds of the ſeveral uſeful Plants have been brought to their preſent Condition by Culture: and the Plants which riſe from them will anſwer, in all Reſpects, while they are well cultivated alſo, to thoſe which produced them. This Cultivation conſiſts in giving them good Land, dreſſing it well, and planting them properly in it. 'Twas this rais'd them to their excellent Condition, and this muſt, and this alone can continue them in it. They are poorer in their State of Nature, and they will, while they are neglected, be returning to that State again. This is called degenerateing; but it is properly a returning to their original Condition: they grow poorer and worſe, but they never alter in their Kind.

The great Articles that promote the ſucceſsful Growth of Plants are two, Heat and Moiſture. Theſe differ in various Climates, and in various Soils. The Degree of Heat generally being according to the former, and that of Moiſture according to the latter. But we ſee that a Soil will often act as a Climate, for the Difference of Warmth is great according to its Nature. There may be as much Variation of Heat between a Field of Sand, and another of Clay, in the ſame County of ENGLAND, as there is between Countries diſtant by many Degrees.

The Effect of this is plain in what is called the Change of Kind among our Grains.

We talk of PATNEY Barley, otherwiſe called Rathripe Barley, as if it were of a Kind really different from common Barley. It is the ſame in Species, but the Difference in its Growth is very great, and by examining this we ſhall underſtand a great deal of this whole Matter.

PATNEY is a Town in WILTSHIRE, the Fields about which are of a ſandy Soil. Sands, we have ſhewn, are naturally hot, juſt as Clays are naturally cold. A Parcel of common Barley being ſown in theſe Fields about PATNEY, will ripen earlier than it would elſe-where: and the Seed of this Crop will keep this Virtue for three or four Generations.

This Seed, ſo rais'd from a Parcel of common Barley, is PATNEY Barley, or RATHRIPE Barley. Let it be ſown on a light and tolerably warm Soil, and it will ripen a Fortnight or three Weeks ſooner than other Barley; and the Grain produced from it will have the ſame Property for ſeveral Succeſſions.

But let this be ſown upon a clayey and cold Land, and it will quickly yield common Barley again.

Thus we may, at any Time, make PATNEY Barley out of common Barley; and make common Barley out of PATNEY Barley again.

On this Occaſion it may not be improper to add one Caution to the practical Farmer, which is, not to ſet ſuch a high Value upon this PATNEY Barley as ſome do. The Change may be

uſeful on particular Occaſions, and for very ſhort Summers, but it is in reality a Change for the worſe. PATNEY Barley is ſhorter liv'd than the common; and it is tenderer, weaker, and worſe. The Novelty firſt recommended it, and Fancy afterwards kept it in Uſe, becauſe of the ſhort Time it is in the Ground: but thoſe who ſow it are, in general, very great Loſers by it.

If this RATHRIPE Barley happen to have a ſmall Froſt after the ſowing, it generally deſtroys it: this is not a common Accident, becauſe it is ſown ſo late: but it may happen; and when it does, the Miſchief is very great: if it have any Check from cold Winds, from an early Drought, or any other Accident, it does not recover as the other, or common Barley will; and at the beſt, if it be brought to a fair Tryal, and a Field of common Barley, and another of this Kind, be ſown on the ſame Day, and have equal Advantages in every Article, the common Barley will yield a much larger Crop, though it be upon the Ground ſomewhat longer. This we have thought proper to add for the Information of the Farmer, who may have been miſled by Opinion, and a popular Practice. There are very few Circumſtances under which it is beſt to ſow the PATNEY Barley; and in all other Caſes the Loſs upon it is certain, and very great.

CHAP. LI.

Of the Effect of Soils on the Growth of Plants.

WE ſee the Soil, in this Caſe, acts in the ſame Manner as a different Climate, changing, as it were, for a Time the Nature of the Grain; and the ſame may be obſerved of all thoſe other Changes which afford the different Kinds of Seed, Wheat and other Corns, diſtinguiſhed by our Farmers under a great Variety of Names.

The Expoſure may alſo act with the Soil in this Caſe. A light ſandy Soil under a tolerable Cover, will ripen any Grain ſooner by a great deal, than a cold tough clayey Land that lies expoſed to the North. The ſame Mountain in the Eaſt produces on the South Side INDIAN Plants, and on the North ſuch as are common to EUROPE. We ſee therefore, by Inſtances at Home and Abroad, that other Cauſes may work in theſe Things the ſame Effects as a Difference of Climate. When we thus underſtand the Nature of theſe Changes, we ſhall not be led into the common Errors about them, which often miſlead the Farmer greatly to his Hurt. This is all the Truth there is in Reſpect of theſe imaginary Changes. The Farmer who reads to learn, and form his Practice according to Reaſon, will therefore know how far he is to regard them, and how far he is to believe thoſe who ſpeak of them. As to theſe leſſer Changes, he ſees to what they are owing; as to thoſe of the varying of one Kind into another, he finds they are falſe. What we have ſaid of the PATNEY Barley may be applied to every other Inſtance, and will be found equally true of all. Though in ſome ſuch a Change is more worth his Regard than in others; becauſe it is more uſeful.

The Flax of FLANDERS is better than the Flax of ENGLAND, as before obſerved. The Seed of FLANDERS Flax, gathered there, and ſown here, will produce as good Flax as there; but the Seed of that Crop which has grown from the FLANDERS Seed in ENGLAND, produces a coarſer Flax, and its Seed a worſe ſtill, till we are neceſſitated to make a Renewal.

It is plain that this is owing to the Difference of Heat and Moiſture, not to the abſolute Difference of the earthy Matter, which is the immediate Nouriſhment. That anſwers for the good Growth as well in ENGLAND as in FLANDERS, as is ſeen in the firſt Crop; but it does not here ariſe to the full Perfection of its forming the Seed, which is the Height of a Plant's perfect Growth; and this is owing to our Country not ſuiting it in Reſpect of Heat and Moiſture.

This appears to be the Caſe on the preſent footing: but perhaps we lay that to the Charge of our Land, which is the Fault of our People. Let them examine ſtrictly upon the Spot, what is the exact Soil on which they raiſe the fineſt Flax in FLANDERS, and what is the Management they give it. Let them fix upon the ſame Soil, and treat it in the ſame Manner here, and perhaps there will then be no Need to ſend thither for Seed. At leaſt the Seed of their Flax will hold good through more Generations, as we ſee is the Caſe in the Inſtance juſt given of the PATNEY Barley; which keeps its Quality many Years, if ſown on Land like that of PATNEY, where it was rais'd, but degenerates quickly into the common Kind, when ſown on any other.

We ſhall enter upon this Subject more largely hereafter, under the Article of Flax; but it was here needful to ſay thus much, producing it as an Inſtance of theſe general Truths.

It is plain from this, and from the many other Inſtances of like Kind mentioned before, that the Nouriſhment of all Plants is the ſame, and that the only Difference is, that ſome Soils abound with that Nouriſhment more than others; and ſome Plants, according to their Nature, drain more of it than others. Therefore there is no Plant but will, according to the Vigour of its Roots, rob ſuch other Plants as are near it: and a Soil which is at one Time proper for one Kind of Growth, will be always fit for it, if kept in the ſame Heart by proper Dreſſings.

This is, in a great Meaſure, contrary to common Opinion, but it is not the leſs true: common Opinion often errs, and in no Reſpect more than this.

On theſe Facts, for they will be found ſuch upon the moſt ſtrict Enquiry, depends that great Improvement of our Huſbandry by the Drill and Horſehoeing Method, which we are about to explain, and which will never be thoroughly underſtood, or rightly practiſed by any who will not thus deeply enquire into the Reaſonings and Experience on which it is founded.

We have abundantly proved that the Matter which nouriſhes all Plants is the ſame; therefore, when a Piece of Ground is exhauſted, by a Wheat Crop, there is no Occaſion to ſow it with ſome other Kind, ſuppoſing it has Nouriſhment for that, although not for Wheat. The better Courſe is to dreſs it properly, and get it into

The Limber
Standards
Plank
Beam
The Bar
The Turnep Drill Plough
The Turnep Drill Plough compleat, without the double Standards
The Hoe Plough
The Beam
Beam
Tail
Shaft
Rane
Whipper
The Bar
The Plank
The Spring Cover
A whole Turnep Seed Box.
A Brass Turnep Seed Box
A Turnep Setting Seed Box
Counter Screw
The Brass Spindle
Setting Screw
Setting Screw
The Mortise laid open.
Fore End of a Wheel Mortise
The Mortise of a Wheel Drill
The Hopper
The Carriage
The Hoe Plough at Work.

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Heart for Wheat again. This is eaſily done by the new Method of Huſbandry, and that without loſing any Time by a general Fallowing, which is a vaſt Advantage.

We have ſhewn the Farmer how, by a proper Management, a Piece of Ground planted with Coppice Wood, ſhall every Year ſupply him a Felling; and we ſhall ſhew, in the ſame Manner, how a Piece of Ground dedicated to Wheat, or any other Corn, ſhall furniſh him a Crop every Year.

It is very plain that the Advantage found by the Farmers in changing their Crops, is not owing to there being Food of a particular Kind left by one, which is taken by the other; but it is owing to other Cauſes: theſe are the Quantity of the nouriſhing Matter left in the Ground by the firſt Crop, the Quantity required by the next Crop, and the Degree of Benefit given by Tillage.

This muſt be the Caſe, becauſe we ſee that all Kinds of Plants growing in the ſame Soil, take in the ſame Nouriſhment. Upon this Principle we act when we propoſe, inſtead of changing the Crop, to improve the Nature of the Soil by more Tillage; ſo that, inſtead of being in a Condition to ſupport only a poor Crop, it may be able to nouriſh one of the beſt Kind; and this is what we now come to treat of under the Article of Drill Huſbandry, ſo much and ſo deſervedly celebrated.

BOOK VI. PART IV.

Of Drill and Horſehoeing Huſbandry.

CHAP. LII.

Of the Nature of Drill and Horſehoeing Huſbandry.

DRILL Huſbandry and Horſehoeing Huſbandry come very properly to be treated together, becauſe they will never ſucceed ſo well as when they are uſed together. Some Farmers have practiſed the Drill Huſbandry alone, and they have found Advantage from it, as doubtleſs they muſt, becauſe of its ſuperior Benefit to the common Kind; but they might have found much greater Profit in uſing both together. We have, in the preceeding Chapters, informed the Farmer ſo fully concerning the Nature and Growth of Vegetables, that he will underſtand the Manner in which this Huſbandry produces ſuch Excellence in all Kinds of Plants, and we may now therefore proceed to the ſhewing diſtinctly and exactly what it is.

Drill Huſbandry is the Practice of the Garden brought into the Field; and Horſehoeing, in the ſame Manner, is that of the Nurſery employ'd in the Service of Corn. We all know the Practice of the Garden to be better than that of the Field, only more expenſive: there is therefore great Merit in bringing it, ſo far as that can be done, into the Field: and the ſame is exactly the Caſe with the Operations of the Nurſery.

In the Field, Corn is ſcattered at Random, and cover'd at different Depths; in the Garden Seeds are ſet in Trenches, drawn with Regularity, and allowed to the ſame Depth, and that adapted to their Natures. Now in the Drill Huſbandry the ſame is done in the Field. A Plow is uſed to this Purpoſe, that makes Trenches of a proper Depth, according to the Nature of the Seed: the Seeds are ſpread in due Quantity in theſe Trenches, and covered equally in them, ſo that the Practice of the Garden is here exactly brought into the Corn Field, only in a more exact Manner: and what is very remarkable, and very advantageous is, that the plowing, ſowing, and harrowing, is all done at once.

When Corn is ſown in the common Way, there is no meddling with the Ground afterwards, becauſe of its irregular Growth; ſo that the Earth cannot be divided and broken, to give it more Nouriſhment; nor can Weeds be conveniently deſtroyed. But in the Drill Huſbandry there may be left Intervals between the Rows, whether they be ſingle or double, and theſe Intervals, admitting the proper Inſtruments, may be tilled ſo that new Nouriſhment may be given to the Roots, and the Weeds may be perfectly deſtroyed: this is exactly the Practice of the Nurſery. Where the young Trees are planted out into Rows, with Intervals of three Foot or more between them; and thoſe Intervals are, from time to time, dug up. This deſtroys all Weeds that would exhauſt the Ground, and at the ſame Time breaking and dividing it, ſerves to create, as it were, new Nouriſhment.

We have explained already in what Manner the Earth is, by this digging and breaking, prepared to give Paſſage to the Roots; and we have ſhewn how thoſe Roots are multiplied by the cutting them off in the digging. This we have ſhewn in Theory; and the Advantage ſo well known to attend this digging between the Rows in Practice, ſhews that what was there advanced is true.

The ſame Effect which digging takes upon the young Trees in a Nurſery, it will take upon the Crop in a Field, whether that be of Corn, or of whatſoever other Kind; for the Reaſon of the Thing is the ſame in both Caſes, and what is thus founded on Fact will never fail. We ſee therefore here the Practice ſo advantageous in the Nurſery, like that of the Garden, brought into the Corn Field; and ſo well have the Inſtruments been contrived by which it is performed, that the Service of Horſes in drawing them, does as well as the Labour of Men's Hands.

When the two Methods of Drill and Horſehoeing Huſbandry are uſed together, the Crop is planted regularly, and the Ground is tilled while it

it is growing. The Seeds are covered to a proper Depth, they are proportioned to the Quantity of Ground, and as they come up the Plants are fed in the moſt happy Manner by a continual new Supply from frequent dividing and breaking of the Ground. No more are rais'd upon it than it is able to ſupport, and theſe have the full Advantage of all its Fertility.

This is the Huſbandry according to the new Method: in this all is Regularity, and in the other all is Confuſion and Diſorder.

CHAP. LIII.

Of Drilling.

DRILLING, according to the Account we have given already, is diſpoſing of Seeds regularly in Rows, and covering them with a Quantity of Earth, proportioned to the Depths at which they are found to be moſt advantageouſly planted. We have ſhewn already how that exact Depth is to be found by Experiments made with Gauges; and we ſhall, in a ſucceeding Chapter, deſcribe the Inſtrument by which it is perform'd, with the Aſſiſtance of a Figure. We here treat in general of the Method.

The Drill Plow makes Channels at regular Diſtances, and of proper Depths; it ſpreads the Seeds in thoſe Channels, and it covers them up with Earth. All this is done with great Exactneſs and with great Expedition.

The Seed Box, which is the great Article in this Invention, is a Part of the Inſtrument: it performs the Office of a Hand in ſowing the Corn, but it does it in a much better Manner; for it numbers out the Seeds as it receives them, and diſtributes them in the Trench with the moſt perfect Exactneſs.

The Diſpoſition of Plants in Rows, which is never to be done in Fields any other Way than by drilling, has, beſide the great Advantages already named, this not trivial Benefit, that the Crop comes up together, and 'tis ſcarce poſſible any Weeds can riſe among it. The Corn, or other Growth whatſoever that is ſown, riſes in Lines, and the Weeds naturally are ſeen in the Intervals between them: and however near they ſeldom are exactly in the Line. This anſwers a Purpoſe not to be deſpiſed, for it betrays Weeds at once by their Place, ſo that they may be taken up while young; whereas, in the common Way, they exhauſt a great deal of the Good of the Soil, before their Shape diſcovers them, even if they are taken up afterwards.

Charlock looks very like the Turnip in its firſt riſing; and there are ſeveral Kinds of Graſs which look like the firſt Shoots of Corn. When theſe grow among thoſe Crops, they muſt ſtand till they are grown up to be diſcovered; whereas, when the Seed has been ſown by the Drill, we know that if any thing riſes out of the Line it is not a Part of the Crop, however much it may reſemble it.

We ſee therefore that the Drill Huſbandry at once places the Seeds in ſuch a Manner in the Ground, that they may have the greateſt poſſible Advantage from it; and betrays, at their very firſt ſhooting, thoſe Weeds which would have rob'd it of Part of that Nouriſhment.

It makes Way for the ſtirring and tilling the Ground, during the Time of the Crops growing upon it, which is a vaſt Advantage, and cannot be obtained by any other Method.

By this Means alſo there is an Opportunity of deſtroying the Weeds at any Growth, in the moſt perfect Manner, which could not be done if the Corn, or other Crop, were diſpoſed in any other Manner than in Rows, leaving theſe free Intervals: and thus thoſe uſeleſs Plants which would have exhauſted the Nouriſhment due to the Crop, are torn up and buried in the Earth, and becoming there, as they rot, a Kind of Manure, they ſupply it with new Matter of Nouriſhment inſtead of exhauſting them.

Theſe are the peculiar Characters and Effects of the Drill Huſbandry, which although in itſelf uſeful, yet has no Benefit ſo great as that it makes Way for the other Improvement by Horſehoeing. They are therefore extreamly to blame who uſe one without the other.

CHAP. LIV.

Of Horſehoeing.

THE Advantage which the Earth receives from Tillage are of two Kinds, the deſtroying of Weeds, and the breaking and divideing the Particles of the Soil, in ſuch a Manner that they may afford more Nouriſhment to the uſeful Growths. Theſe Advantages cannot be obtained by any other Method ſo perfectly, as by Horſehoeing; and therefore, in the Nature of the Thing, Horſehoeing Huſbandry is preferable to any other Kind.

The Plow prepares the Ground for a Crop; but it goes no farther, for it cannot be uſed in the common Way of Huſbandry, after the Crop is up: but the Crop may receive greater Benefit from the Tillage of the Land while it is growing, than it could in the Preparation.

When the Earth is well prepared for a Crop, it is broken and rendered looſe, but from this Time it naturally clods together, and grows more compact. Plants require more Nouriſhment when they are grown to ſome Height, than when they are very young; but in this common Practice they have leſs: becauſe the Soil grows worſe and worſe from the Time of ſowing. The Horſehoe breaks and tills the Land while the Crop is growing; and by that Means gives the Plants a new Supply, when they moſt want it.

Plowing and hoeing differ in this more than in the Form or Shape of the Inſtruments with which they are done: a Hoe may anſwer the Uſe of a Plow in breaking the Ground before ſowing; and a Plow may be uſed, as it really is in this Method, to tear up the Weeds while the Crop is upon the Ground. It is in this Period of performing it, that the Work actually differs. As plowing is the preparing Land for the ſowing of a Crop, hoeing is the tilling it when that Crop is growing to Maturity.

If Land be tilled ever ſo well before hand, that will not prevent the Growth of Weeds, for although

although the Roots of all that grew there before were deſtroyed, the Seeds of others are continually brought by the Wind, and the better the Condition of the Land is, the ſurer they will be to grow.

To the Farmer's Misfortune thoſe Weeds which are moſt troubleſome and miſchievous, have Seeds winged with Down, ſo that they fly to great Diſtances. Of theſe Kinds are Thiſtles, Sow Thiſtles, Coltsfoot, and many others the moſt troubleſome that can infeſt a Crop.

No Care in tilling the Land before hand can defend it againſt theſe; on the contrary, the fitter it is for the Crop, the fitter it is alſo for them: the more firmly they will take Poſſeſſion, and the more quickly they will multiply, therefore ſomething is needed afterwards. The Labour of Weeders is very expenſive, and in the common Way of ſowing they cannot avoid greatly damaging the Crop. When the Seed is drill'd it is eaſy to get between the Rows, even with a large Inſtrument, and the Advantage is evident; and the Work cheaper.

We ſee the Benefit that Herbs receive from a careful tranſplanting, this ariſes from the cutting off the Ends of their Roots, and the placing them among new dug, that is, new tilled Earth. This would be impoſſible in many Caſes; for who could think of tranſplanting a Crop of Corn; but the ſame Advantage is given it when it is planted in regular Rows by the Drill, and the Earth is plowed up between by the Hoe Plow; for in this Caſe the extream Roots are cut off, ſo that the Plant is urged to ſend out more, and there is new tilled Earth for their Reception.

The Advantages ariſing from the hoeing a Garden Crop, in the common Way, with a Hand Hoe, are very great; and theſe are all communicated to a Field of any uſeful Growth, by the Hoe Plow properly uſed, only in a more perfect Manner.

Some People who follow the new Method rob themſelves of half its Benefit, by their Fear of ſetting about it with Spirit. They drill their Seed in Rows a Foot and half diſtant, and then cut up the Earth lightly by a Horſe Hoe between. This is of the Nature of the Garden hoeing, and is of great Advantage, but let it be done properly, and it will be of much greater.

If Wheat be drilled in treble Rows, with Partitions between each Row of ſeven Inches, and there be an Interval of five Foot between every three Rows, and the next three; in this Caſe the Corn itſelf will prevent the Growth of Weeds in the Partitions, and the Ground in the Intervals may be tilled deep and well with the Hoe Plow, and the Crop will be twice as good as in the other Way.

CHAP. LV.

Of the Benefits of deep hoeing.

THE ſhallow turning up the Earth between the near Rows, ſerves as hoeing in Gardens, aſſiſting the preſent Crop, but it has no farther Effect; on the other hand, the deep hoeing in the five Foot Intervals, ſerves in the Place of fallowing, and will, if the Farmer pleaſe to do it well, and depend upon it entirely, anſwer the Purpoſe of Manure; though on many Occaſions it will be worth his while to aſſiſt his Crops by both Means.

The hoeing in this deep and perfect Manner keeps the Earth always moiſt, it diſpoſes it to receive and detain the Dews and ſmall Rains. The more Land is tilled the more freely it receives the Benefit of theſe, and the more ſerviceable it makes them to the Crop. A Piece of hard Land is either dry as a Stone, or poach'd with Wet, for it detains what falls upon it too long; and often this is ſo chill'd that it hurts the Growth. The fine and well tilled Earth, as it receives the Rains and Dews, diſtributes the Wet equally, and as it does double Service, it never can do any Harm.

Experience confirms all that is here ſaid of the Benefit of deep hoeing. If a Piece of poor Ground be ſown with Wheat, when the Plants are yellow and ſickly, let a Part of the Field near them be well hoed in this Manner, and they will be found to revive immediately, as if watered by the moſt kindly Shower, and they will continue to grow and thrive in Proportion as the Practice is continued.

It may be proper to acquaint the Reader here, that if he expect the full Advantage of hoeing, without any Injury or Accident, he muſt prepare the Ground for it by a thorough and good Tillage beforehand: for when the Earth is hard, as it will be when but half tilled, the Hoe Plow often breaks it up, or cracks it among the Rows, if it be carried deep enough; but when the Earth has been put into a good Tilth before, there never comes any Harm of the deepeſt hoeing, for it all crumbles at the Surface about where it is turned.

For the ſame Reaſon that the ſtirring and breaking of the Earth is uſeful in affording Nouriſhment to the Plants that grow near it, the deeper that is perform'd, provided we do not go through the good Soil, the more will be the Advantage: for Plants ſpread their Roots in Breadth and ſend them down in Depth, to a certain Degree at the ſame Time; ſo that the Intervals between two Rows of Corn, by being ſtir'd and broke to eight Inches deep, afford a certain Proportion of Nouriſhment, which the Corn would not otherwiſe have had. If the Earth be ſtir'd and reduced to a proper Degree of Fineneſs, to ſixteen Inches deep, provided it be good and fit for the Nouriſhment of Plants ſo far down, the Conſequence will be, that the Plants in the Rows will receive Nouriſhment from it in a double Proportion. This is the Difference between that ſlight hoeing that is perform'd between the Rows of a Foot and half Diſtance, and the deep hoeing between thoſe where the Interval is five or more Feet.

This ſhews alſo the Propriety of leaving thoſe wide Intervals: and all that will reaſon upon the Matter muſt find, that it will be to their Advantage to have ſuch; but nothing is ſo difficult to conquer as Prejudice: and that is againſt the Practice in this its full Latitude.

A Farmer, when he is directed to plant his Wheat in treble Rows, likes that well enough; but when we name a five Foot Interval between theſe Sets of Rows, he ſtarts at the Thought of loſing ſo much Ground; for ſo Prejudice and the common Opinion, repreſent it to him. But we ſhall ſhew him that there is no Way in which the Ground does ſo much Service, or turns to ſo great Account. In order to be perfectly underſtood, let us firſt enter upon the Conſideration of the Rows.

The Drill Plow may be ſo made as to ſow a great many Rows at a Time, and thoſe at ſmall Diſtances: but this is not the moſt profitable Uſe of it. Some who are, at this Time, introducing the Uſe of Drill Huſbandry without Horſehoeing, are practiſing this, and call it an Improvement; but they ſhould be better inform'd. It was practiſed long before by Mr. Tull, and he gave it up becauſe he found it leſs profitable than the other. Drill Huſbandry and Horſehoeing Huſbandry are two Things, but they ſhould never be ſeparated; and to practiſe them to the beſt Advantage, the Rows that are ſown by the Drill ſhould never be too near.

Some Plants, as we ſhall ſhew hereafter, thrive beſt in ſingle Rows, with large Intervals between, and others do very well with three or four Rows near together, and then a large Interval. In this laſt Caſe the Rows ſhould be about ſeven Inches diſtant from one another, and the Intervals between one Set of them and another, conſiderably broad.

When theſe three or four Rows riſe up to a ſmall Height, they blend in ſuch a Manner at Top, that they make one broad Row together. We call them altogether, in this Caſe, a Row, and when we ſpeak of the Intervals, we mean thoſe between one Set of theſe Rows and another.

Theſe Intervals are to be broader or narrower, according to the Nature of the Plants in the Rows, the largeſt Plants requiring them broadeſt, and receiving moſt Benefit from them.

Every Row of Plants to be horſehoed, muſt have an empty Space at leaſt on one Side, of two Foot and a half broad for the ſmalleſt Kinds, and for all Sorts of Corn it ought to be about five Foot. Smaller Intervals do in Gardening, becauſe the Hand Hoe only is uſed, and does not go deep; but when the Hoe Plow comes, and cuts up to ſuch a Depth, a larger Space is required, becauſe the Roots of the Crop will penetrate farther.

The Farmer will be the more eaſily reconciled to this Practice, when he ſhall be told that although there be five Foot Spaces between the Rows of Wheat in an Acre of Ground, yet the Stalks in thoſe Rows will be more in Number, than there are uſually upon an Acre in the common Way. This may be found by Computation, and this ſhews plainly, that it is an Error to imagine there is any Loſs of Ground by Means of theſe Intervals.

If the Ears were equal in Weight and Goodneſs, the Crop would be equal, becauſe there are the ſame Number one Way and another; but the Ears are finer and better filled in the horſehoeing Way, and therefore the Produce is greater. Theſe are Facts, and this is a Manner of arguing that cannot miſlead.

When theſe Intervals are horſehoed, the Roots of the Crop penetrate quite through them. Therefore the Crop upon a Piece of Ground thus managed, while it ſeems leſs is really greater than in the other Way; and though a great Part of the Land ſeems unoccupied by it, yet every Particle of it is occupied, for as the Roots from the Rows penetrate through the Intervals, they alſo entirely ſpread over or fill thoſe Intervals.

Many Experiments have been made to determine this Matter of the Loſs or Gain by theſe large Intervals, and the Reſult of all is, that the larger the Intervals are left, to a very conſiderable Breadth, the greater always is the Crop.

In the ſame Field wide Intervals and narrow Intervals have been try'd, both without the Aſſiſtance of Dung; and in the other Parts of the Field Dung has been uſed in the common Way without hoeing. The Reſult of ſuch Experiments muſt be concluſive; and it has appeared from theſe, that the dung'd Part without hoeing, did not yield a Crop nearly equal to the hoed Part; and that the hoed Part, where the Intervals were wideſt, yielded the largeſt Crop of all. Therefore hoeing is preferable to Dung on two Accounts, for it coſts leſs, and it produces more; and the wider the Spaces the more Benefit there is from the hoeing. But theſe are only the general Facts, the Farmer is not to determine his Practice by them in every particular Inſtance. We ſhall, on ſome Occaſions, adviſe him to have the Intervals moderate, and on others to uſe Manure with the hoeing.

CHAP. LVI.

Of the different Appearance of Crops.

THE Corn ſown in the common Way often will make a better Appearance at firſt, than that which is drilled and horſehoed; but it declines toward Summer, as the other advances: and though the Seed Corn have been the ſame, and the Land the ſame in every Reſpect, the Crop from the horſehoed is, as obſerved before, vaſtly the larger.

When the Intervals are ſufficiently large, they may be horſehoed ſeveral times while the Crop is growing in the Rows: in this Caſe the Plow may come pretty near the Edges of the Rows the firſt Time, but not ſo near the ſecond, and ſo on, till for the laſt Time it muſt be carry'd only along the Middle. The Reaſon of this is, that it would elſe crack the Ground too much in the Rows, and break off too many of the largeſt Roots, if the Inſtrument run very near, when the Crop was well advanced in Height.

It is always to the Advantage of Plants, that the ſmall Roots ſhould be broke off, but when they are grown to a conſiderable Size they will receive too great a Check by breaking off the larger; therefore only the Middle of the Interval is to be broken up at that Time; and even there, there will be ſmall Roots, which being broken off by the Plow, will ſend out innumerable others into the Earth thus prepared to receive them,

them, and giue them Nouriſhment. Theſe new Roots are full of Mouths for receiving Nouriſhment, as has been ſhewn already, and they find it in Abundance; ſo that Reaſon ſhews how it is that this hoeing only in the Middle of the Interval ſo vaſtly invigorates the Plant.

It is very plain, from repeated Trials, that this Practice of hoeing will give more Nouriſhment to a Crop that has no other Aſſiſtance, than the common Method by Dung; but there is a farther Conſideration ariſing from the Continuance of the Effect, which is of very great Weight, this is, that ſo far is the Land in general from being exhauſted by this Method, that the more ſucceſſive Crops are planted in a Piece of Ground, with wide Intervals, and well hoed, the more able the Land is to maintain them. The laſt Crop is better than any of the former, and this without renewing the Richneſs of the Ground by Dung, or expoſing any Part of it to the Loſs of Time by a Fallow. This hoeing ſerving in the Place of fallowing; and the Intervals, while they are ſupplying the preſent Rows, being preparing for the Support of others.

The Kind need not be chang'd as it muſt be in all other Huſbandry, becauſe of the Ground's growing poorer, for in this Caſe it does not grow poorer, but becomes richer every Year.

When a Piece of Ground is prepared by Dung, it bears Wheat the firſt Year, but the next Crop muſt be of an inferior Kind, becauſe the Soil thus prepared, is growing worſe continually. But on the other hand, the Ground is growing better continually, by this Method of Horſehoeing, and conſequently Wheat may grow on it every Year.

If there were to be any Change of Kind in Fields thus tilled, it would be that the firſt Crop ſhould be the pooreſt, and that the Farmer ſhould riſe to a better and better every Year, till at laſt he come to Wheat: but it may, in general, be prepared for Wheat at firſt, and will continue fit for it throughout.

The wider the Intervals are, the more the Earth may be divided, but as there muſt be a certain Compaſs to allow a Poſſibility of the doing it well, we ſhall ſhew what is the ſmalleſt Space that will allow it. There is not Room to turn two deep clean Furrows in an Interval that is narrower than four Foot eight Inches. If any one ſhould attempt it in a ſmaller Interval, he would throw one of the Furrows, if not both, upon the next Row, and this would do great Damage. Such Plants as grown Saintfoin and the like, that can bear to have the Earth drawn off of them by Harrows may indeed bear this, but even they will be the worſe for it.

The Farmer is, in all Reſpects, to ſuit his Practice to his particular Situation: let him not therefore be tempted by all that is here ſaid, though it be all perfectly true, to follow this Method of horſehoeing againſt all other Meaſures, in every Situation. If he have a dry and brittle Land, on a level Situation, he is beſt of all ſuited for it, for it is with this Land it beſt agrees. If he have tough heavy Clays let him firſt improve them well with Sand, as directed in its Place, and then uſe the Horſehoeing Huſbandry; and if he have Lands upon the ſteep Deſcent of Hills, let him then follow the old Method, at leaſt in ſuch Places; for they are not ſuited to a Practice which requires ſo frequent and ſuch deep Tillage. In common Fields as the Cuſtom and Practice ſtand at preſent, he cannot well follow this Method: but from what we have ſaid on that Head already, and from what Truth and Reaſon ſo plainly point out, we hope we ſhall ſee this Objection to the Horſehoeing Huſbandry daily diminiſh; and Incloſures take the Place of common Fields, in every Part where private Perſons can diſcern their own Intereſt or publick Good promote it.

This Method of Huſbandry has been adopted very much in FRANCE, and has been found, by frequent Trials and the ſtricteſt Computations, to be greatly preferable to the common Practice, and as we ſee the Farmer's Profits ſo low that the Rents in moſt Places are ill paid, and the Farms continually thrown up; is it not greatly to be wiſh'd that a Practice invented in our own Country, ſhould alſo be followed in it, while we ſee others enriched by uſing it, and ourſelves impoveriſhed for want of ſome Improvement in the common Methods? The Legiſlature has interfered lately to introduce the Uſe of Broad Wheels, partly by Penalties on the other Side, and partly by Rewards and Encouragements to thoſe who ſhall uſe them. How much is it to be wiſh'd, that the ſame Interpoſition could be obtained in Reſpect to this Practice, the Conſequence of which muſt be as much more beneficial, as the Importance of being enriched is greater than that of Travelling at Eaſe.

As to the Objection of uſing this Improvement in common Fields, the ſame holds good againſt any other. We have found, of late Years, the Advantage of raiſing what are called the Artificial Graſſes, Saintfoin, Lucerne, and the like. But this can no more be practiſed in common Fields than the Horſehoeing Huſbandry, becauſe People muſt obſerve the ſame Turns of plowing and fallowing with the other Occupiers. All that can be infer'd from this is, that the Interpoſition of the Legiſlature is indeed wanted for the Encouragement of Huſbandry.

Having thus laid down the Advantages of the Drill and of the Horſehoeing Huſbandry, and ſhewn why they ſhould always be uſed together, we ſhall proceed firſt to explain to the Farmer, the Inſtruments that are employ'd in this Practice, and then to the Manner of uſing them for the ſeveral Kinds of Crops. We ſhall firſt convey to the Reader a general Idea of the Drill Box; and afterwards appropriating it to Wheat, the moſt conſiderable Species, we ſhall ſhew it by Deſcription and Figures, as fitted up for Uſe in the Drill Plow; and having thus explained the Manner of ſowing the Corn, we ſhall deſcribe the Hoe Plow, by which the great Advantage of Horſehoeing is to be given to the Crops properly diſpoſed by theſe Inſtruments.

CHAP.

CHAP. LVII.

Of Drill Boxes.

IN the Drill Huſbandry an Inſtrument is us'd for ſowing which performs at once the ſeveral Operations of opening the Trenches, diſpoſing the Seeds in them, and covering it up when there. The firſt Part is performed by a Plow, the ſecond by the Drill Box and the third by the Harrow.

The Plow has its Shares ſo diſpoſed as to cut the Trenches of a proper Depth, at regular Diſtances, and in a certain Number; the Drill Box diſpoſes the Seeds; and the Harrow covers them. Theſe three Parts compoſe one Inſtrument. The Harrow we have occaſionally named already, among the other Implements of that Title, and we ſhall treat of it more largely, as alſo of the Plow: the preſent Buſineſs is to conſider the Structure of the middle Part, the Drill Box, which is the material Article.

The whole Inſtrument conſiſts of the Plow and Harrow, the Seed Box and Hopper: of theſe the Seed Box is the great Conſideration, this receives the Seed from the Hopper, and delivers it out regularly into the Trenches.

The Mortiſe is a very material Part of this Implement, and it differs from a common Mortiſe, in that it is impoſſible, from its Shape, to fit it with a Tenon, being narrower above, and ſhorter below; all this will be repreſented in the Figures.

A Multitude of Words might be uſed to deſcribe this, and the other Parts of a Drill Box, but the Aſſiſtance of the Plates will ſpare them. It is ſufficient if we can convey ſuch an Idea of them that the Farmer will be able to underſtand them, when we have Occaſion to mention them, and the Workman to make them, and to compoſe the whole: more than this we ſhall not endeavour.

This Mortiſe being underſtood, we ſhall conſider its Uſe in the Drill Box, and thence the other Parts of that Machine. Let us ſuppoſe it a Seed Box for Turnips, it will appear as repreſented in the Figure under that Name. The Reader will there ſee the upper and lower Edges, and the Manner in which they are placed over one another. We ſhew the Top of the Mortiſe, and the Bottom with the lower Edges.

We have repreſented, in another Figure, this eſſential Part, the Mortiſe cut through and laid open. It is ſhewn as cut down by its four Corners. If the oppoſite Sides and Ends were all rais'd up, the Mortiſe would be formed. A great deal of Care muſt be taken in making this true, for upon that the Succeſs of the whole Inſtrument depends.

We have added after this the Mortiſe of a Wheat Drill, in order to ſhew that very eſſential Part the Box, or great Hole, which being larger is beſt ſhewn in the Side of that Kind. This Perforation is the Section of a Cylinder that paſſes through the Mortiſe.

We have repreſented in another Figure, the Tongue of the Seed Box, which, in ſome Degree, reſembles the Tongue of the Sound Board of an Organ; but it differs, as is evident, in Shape, in Situation, and in the Manner of its being fixed to the Mortiſe. The Breadth of this Tongue muſt be conformed to the Breadth of the Mortiſe and its Bevel. The Length of it muſt be ſuch that it will reach lower than juſt to touch the Bottom of the great Hole.

If the Tongue have too much Play, the Seed is apt to be turned out irregularly.

We have next given the Figure of the Steel Spring in a Turnip Seed Box, which ſerves both for a Tongue and a Spring.

The Setting Screw is another very material Part of this Inſtrument, we have therefore repreſented this plainly and ſeparately. It muſt be of Iron, and it is to paſs through the Hole in the fore End of the Mortiſe.

We have next repreſented a Notch of the Spindle, with its Ends near it. And we have next given the fore End of a Wheat Mortiſe, with its Hole through which the Setting Screw is ſcrewed: and after this the hinder End.

Theſe are the principal Parts of this uſeful Implement, which the Workman will eaſily underſtand; and which we have named and figured, becauſe we ſhall naturally ſpeak of them in the Courſe of the Work. And having thus firſt repreſented them ſeparate, we have given after them the Wheat Seed Box entire, with all its Parts and Appurtenances: it is there repreſented as ſtanding on its Bottom; and the Reader will eaſily diſtinguiſh its Cover, which ſhould be of Braſs, and the Tongue hanging upon its Axis, the End of the Iron Screw, and the Notches of the Spindle. This Spindle is kept from moving Endways by Wreaths, in the ſame Manner as the Axis of a Wheel-barrow.

We have next repreſented the Outſide of one half of the Braſs Seed Box: and after that one half of a Braſs Turnip Seed Box, lying with its Inſide uppermoſt; and afterwards the whole. And we have there given the Spring Cover and the Setting Screw ſeparate: we have afterwards ſhewn the Counter Screw and the Braſs Spindle, in which Place we have repreſented the Manner of its turning.

In theſe Figures we have endeavoured to explain to the Farmer what is meant by the Seed Box, and its ſeveral Parts, as they may be named ſeparately or entire in the ſucceeding Chapters. The Workman will alſo have a general Idea from them, and if he have been accuſtomed to Things of that Kind, will not find it difficult to execute one from theſe Parts ſeen diſtinctly, and the View of the whole. But as the greateſt Nicety and Delicacy is required in the conſtructing thoſe ſeveral Portions, and putting them together; we would adviſe the Workman who has never made one, to refer himſelf to the ſeveral Cautions and Directions given at large by Mr. Tull, in his Horſehoeing Huſbandry; we write to inform the Farmer, not the Mechanick, and muſt not treſpaſs too far upon the Plan we have laid down to ourſelves in the firſt ſetting out of our Work. We cannot, within the Compaſs of our Intention, expatiate farther on the Structure of this

Inſtrument, but hope the Figures, which ſave ſo many Words in the Deſcription, will be ſufficient for the Purpoſes to which they were introduced.

CHAP. LVIII.

Of the Wheat Drill, and Turnip Drill.

HAVING, in the preceding Chapter, deſcribed the Nature of the Seed Box, in this Method of Huſbandry, we ſhall here ſhew its Uſe, and the Manner of connecting it with the Plow, Hopper, and Harrow, for the immediate Service in the Field: firſt inſtancing their particular Structure as appropriated to the ſowing of Wheat.

We have repreſented this Inſtrument entire in a Figure; where the Situation of the Seed Box laſt deſcribed, and of the Harrow mentioned in a preceding Chapter, are explained to the Eye, and their Uſes evidently ſhewn.

The Plow repreſented there, is one calculated for drilling Wheat in treble Rows. Theſe Rows are placed at ſeven Inches Diſtance, and the Harrow which moves on its Beams covers the Seed in the ſame Operation.

The Plank repreſented in the Center of the Figure, ſhould be, for this Purpoſe, three Foot and a half long, eight Inches and a half broad, and one Inch and a quarter thick. And its upper and under Surfaces muſt be true Planes. The two Beams of the Plow are to ſtand directly under the Plank, and muſt be held up to it by Screws with Nuts. Theſe are to be two Foot four Inches long, two Inches and three quarters broad, and two Inches and a Quarter deep.

This Plow makes its Channels by Means of three Sheets, which have their Shares and Trunks. The firſt or foremoſt of theſe ſtands under the Middle of the Plank, and to ſhew its proper Structure we have added a Figure of it ſeparately. It is placed obliquely, and pointing forwards in the Plow, that it may be out of the Way of the Funnel. It ſhould be an Inch thick on the upper Part, but the reſt of it need be no more than the Thickneſs of the Share. We have ſingly repreſented alſo a Share lying Bottom upwards; we have alſo repreſented ſeparately one Side of the Trunk, which is a thin Plate of Iron, and is very well made out of the Blade of an old Scythe: this is to be riveted on to one Side of the Sheat. And after this the Trunk entire, which is formed by this Plate, and ſuch another on the oppoſite Side.

After this we have repreſented ſeparately one of the hinder Sheats.

The Figure of this cannot be miſtaken, and its Situation in the Plow is at one of the Beams, as the other is at the other. They are both faſtened into the Beams by their Tenons, which are driven into a Mortiſe made for that Purpoſe, and faſtened by a Pin paſſing through the Beam.

The Figure will ſhew the Workman how he is to make theſe, but it may be proper to caution him not to make the Tenons acroſs the Grain of the Wood; but to chuſe for this Purpoſe a crooked Piece of Timber.

Theſe Things being underſtood, of the Parts and their Structure, we may continue the Conſideration of the Plow as repreſented together. The fore Sheat being fixed up at equal Diſtance from each End of the Plank, and as near as can be to its hinder Edges, the Funnel has Room to ſtand with the fore Side of its Hole to make one Surface with the Back of the Sheat: and the hinder Part of the Trunk does not reach the Edge of the Plank. The Fore-Standard muſt ſtand perpendicular to the Plank acroſs the Tenon of the Sheat.

This Standard being thus cloſe to the fore Side of the fore Hopper, there muſt be ſo much Room between it and the Hole of the Funnel, that the Seed may drop from the Seed Box into the Middle of this Hole.

The two hinder Sheats muſt be placed at equal Diſtance from the Sides of the Beams, and ſo near to their hinder Ends, that there may be Room to make the Funnels in them, and their Tenons to come up between their reſpective Funnels and Standards; theſe Standards alſo muſt be ſet perpendicular to the Beams. The Beams muſt be placed at ſuch Diſtance from one another, that the Shares may be fifteen Inches aſunder, from the Inſide of one to the Outſide of the other; and the Shares muſt be all parallel to one another, and to the Beams.

This being the Structure of the Drill Plow, the Channel or Trench that is made by the Middle, or fore Share or Sheat, being at an equal Diſtance from the two hinder Sheats, is filled up, and the Seed is covered in it by them; and the Seed in the Trenches made by the two hinder Sheats, is covered by the Harrow, which is faſtened to the Beams of the Plow, and has two Tines placed juſt at a right Diſtance for that Purpoſe: of this we need not give a farther Deſcription. Its Figure and Situation behind the Plow repreſent it ſufficiently, and we have had Occaſion to deſcribe it before, among the other Kinds of Harrows.

The Funnel riſes two Inches at the Edges from the Surface of the Plank, and is five Inches ſquare at the Top; and its Hole at the Bottom is continued quite through the Plank, into the Trunk that is underneath. This Hole is ſquare. Its Opening for Wheat and other Grain, is to be three quarters of an Inch; but when Peaſe, Oats, or other large Seeds, it may be made an Inch ſquare, and it is to be a little wider at the Bottom than the Top. The other Funnels are to be made exactly like this. They cannot be ſo deep, becauſe they are cut in the very Beams, but their Width at Top is encreaſed by adding on each Side a Piece of Wood, ſo that they are each an Inch and quarter wider than the Breadth of the Beam. The upper or fore Side of theſe Trenches muſt not riſe ſo ſlanting as the others, becauſe that would bring them too near the Tenons of the Sheats.

Acroſs the Plank of this Plow, near its Edges, there lie two Pieces of Wood: theſe are each eleven Inches long, two Inches broad, and two thick. They are faſtened by Screws and Nuts, and ſtand parallel to the other Beams. Each

of theſe have a double Standard or Fork, perpendicular to the Plank, and by theſe Standards the fore Hopper is drawn and guided.

Having thus far examined the Nature and Make of the Plow itſelf, which could not be ſo well comprehended in a Figure, if drawn entire with its Hopper, we have repreſented it again in that perfect Condition, fully fitted up, and ready for Work. In this and the other Figure ſeen together, all the Parts may be very plainly diſtinguiſhed.

The fore Standard, which riſes from the Front of the Plank, is to be two Foot long. Its Breadth is to be two Inches in the narroweſt Part, and it is to be half an Inch thick in the thinneſt, and two Inches at its Shoulders above the Plank. We have repreſented it ſeparately, and it will be ſo ſeen in what Manner it is pinn'd through the Plank before the Funnel. It holds the fore Hopper from turning upon the Spindle. It is put through a Carrier like that of a Door Latch, which is nailed on the upper Part of the fore Side of the fore Hopper. In this the Standard has Room to play, or move Sideways, that either Wheel may riſe up.

We have repreſented ſeparately alſo a hinder Standard, which being placed perpendicularly in the Beam, is fixed in a Mortiſe, and pin'd into the Beam. It has a Shoulder behind, another before, and a third on its Outſide, and theſe ſerve inſtead of Braces to keep it from moving backwards, forwards, or outwards. This is two Foot four Inches long, two Inches broad, and an Inch thick.

The two hinder Standards are made juſt alike except for their oppoſite Situation, their Uſe is to guide, draw, and hold up the hinder Hoppers, which are repreſented in the Figure where this Plow is ſhewn compleat, in their Places. They are to ſtand upright, and in the Middle of the Beams, and at ſuch Diſtance before the Funnels, that when the fore Side of the Hopper, by its whole Length, bears againſt the hinder Surface of the Standards, the Seed may drop into the Middle of both Funnels.

The Shafts, or Limbers, are repreſented in both Figures, they are to be fix'd down to the Plank, each by two Screws and Nuts, and they are kept at a due Diſtance by the croſs Bar, which runs from one of them to the other, at a ſmall Diſtance from the Plank. Theſe Shafts muſt be ſo placed that the Path of the Horſe is ſtrait with the Center of the Plow, and then it will follow in a direct Line.

The Uſe of the Trunks in this Inſtrument is for making the Channels narrow. Without Trunks theſe Channels muſt be made with Ground Wreſts, which ſpread the Sides of them wide; but theſe Trunks make them narrow of whatever Depth.

We have repreſented ſeparately one End of a hinder Hopper laid open, the middle Part is cut out to give a cloſer Sight of the Plow and fore Hopper. The whole Hopper is repreſented alſo ſeparate and entire; as alſo a Hopper with its Standard, Spindle, and Seed Box. By theſe Figures the entire Mechaniſm of this Inſtrument will be underſtood. At the Bottom is ſeen one End of the Spindle paſſing through the Hopper and Seed Box.

The bottom Board of this Hopper, which holds the Braſs Seed Box, ſhould be four Inches broad, and full half an Inch thick. And at each End it muſt be a quarter of an Inch longer than the Seed Box. We have alſo repreſented ſeparately the two Sorts of Wreaths, which are ſcrewed upon the Spindle to keep it from moving towards either End, as well as to hold the Hoppers in their Places, one Kind may be made of Wood, the other muſt be of Braſs, and is greatly preferable in all Reſpects.

When the Plow is all together, as in the Figure where it is repreſented entire, the fore Hopper ſhews itſelf very diſtinctly; it is ſeen with its Seed Box ſtanding on the fore Funnel: this is larger than the hinder Hoppers, but there is no more than the ſame Quantity of Seed to be put into it, when it is uſed.

As to the Wheels of this Plow, the Diameter of the fore ones is to be thirty Inches, and that of the hinder ones twenty-two; and their Spokes are to be made ſtrait, ſo that they are not hollowed in the Manner of other Wheels.

Thus have we repreſented to the Eye this complicated Inſtrument, and explained its Parts by a few plain Words. A Volume might be written upon it; but by this the Farmer will underſtand enough of its Operations, and the Plow-wright of its Form.

This is the Drill for Wheat, and the little Variations neceſſary to be made in it for other Seeds will eaſily be comprehended. However, we have added the Figure of the Drill Plow for Turnips, that the general Difference may be ſeen. The Funnel, Sheat, Share, and Trunk, which are the eſſential Parts for the Work, are the ſame as in the Wheat Drill already deſcribed, with very little Variation; and the Inſtrument is the leſs complicated, becauſe it is to ſow but one Row, not three at a Time, as is done in Wheat, which made the Neceſſity of three Hoppers, and, in a Manner, of a treble Apparatus, which is in this Caſe ſingle.

He who underſtands the more complicated Kind, will find no Difficulty in comprehending every Part of this, the principal Difference of which is, that it is ſingle. The Shafts in this are to be light, and the Bar is to be about three Inches diſtant from the Plank. The Plank ſhould be two Foot and an Inch long, five Inches broad, and an Inch and quarter thick; and the two Pair of Standards placed into the Plank, with Shoulders above, are to be th'rteen Inches high above it. The Beam of the Plow is to be two Foot two Inches and a half long, four Inches broad, and two Inches thick. The Funnel is to be two Inches deep, and four Inches ſquare at the Top. The Harrow follows in its Place, and the Tines are made of Wood: and they are to ſtand eight Inches aſunder at their Points, and ſix Inches and a quarter at their upper Parts, juſt under the Harrow Head. The Hopper of the Turnip Drill conſiſts of a Box placed in to the Middle of a Carriage, we have repreſented this ſeparate, that its Figure may be more diſtinctly underſtood, and afterwards the Carriage in the Middle of which it is placed.

The Circles of the Wheels of this Hopper go five and twenty Inches aſunder.

The double Standards are uſed on a Level, and not otherwiſe. We have therefore added another Figure of the Turnip Drill Plow, entire and fit for working without them.

CHAP. LIX.

Of the Hoe Plow.

WE are aware that this Deſcription of the Inſtruments will appear tedious to ſome, and that it will be ſaid, as there are People enough who know how to make them, why ſhould their Parts be deſcribed here. Others have beſtowed many Sheets upon them, where we have compriſed what we thought needful to be ſaid in a few Pages. But ſomething beſide the bare Figures we thought neceſſary, becauſe we would have every Farmer entertain at leaſt a general Knowledge of their Nature; and becauſe we otherwiſe ſhould not have been underſtood in the ſucceeding Chapters, when we come to name their Parts, in treating of the Manner of uſing them.

We have gone through the moſt complicated, and longeſt Detail, in the Article of the Drills, the Reader will give us his Indulgence while we explain, in very few Words, the Hoe Plow, or Horſehoe, which is an Inſtrument much leſs compounded, and much eaſier underſtood.

We have given a Figure of the Hoe Plow entire, and the Reader who is already acquainted with the Structure of a common Plow, and the Names and Uſes of its ſeveral Parts, will be at no Loſs to underſtand this.

The Beam and Tail are very like thoſe of the common Plow. Indeed the Reſemblance is ſo great, that the Beam of a common Plow being cut off, and ſcrewed up to the Plank of this, with its Shafts tight, make a good Hoe Plow.

But to make a Hoe Plow perfectly and properly, it is better to ſet about it entire, and for that ſingle Purpoſe. The Share, from its Tail to the fore Part of its Socket, ſhould be two Foot and one Inch long, and from thence to the End of the Point, ten Inches and a half: this is the proper Meaſure of its under Side. The Length of the Plank ſhould be two Foot ſeven Inches and a half; it ſhould be nine Inches broad, and two and a half thick. The Shafts are to be ſcrew'd to the Plank, in the ſame Manner with the Beam. And the Draw Pin, whoſe Nut is ſeen in the Center of the Plank, is to have a Crook underneath, to which one of the Links of the ſhort Chain of the Whipper is faſtened. The under Surface of the Shafts runs on a Level with the Plank, and they are to crook outwards till they come within a Foot of the Chain, theſe Shafts muſt be ſtrong and well made. The Notches in the Ends of the Whipper, ſerve to faſten the Traces of the Horſes. And the ſhorter the Shafts are from the Bar the better, ſo they are ſufficient in Length for their Purpoſe.

This Plow is a very plain and very excellent Inſtrument. It is ſet to go deeper or ſhallower, by changing the Links of the Chain of the Shafts which lay hold of the Crook. This has the ſame Effect in the Hoe Plow, as the changeing the Pins to different Holes of the Crow Staves in a common Plow. We have repreſented ſeparately the Beam, with its Mortiſe and Holes; and the Plank which, by its Holes and dotted Lines, ſhews the different Manner of placing the Beam. The four Holes near the Ends, are for ſcrewing down the Shafts.

There are uſually nine Holes in the Plank, for changing this Situation of the Beam, that the Plow may fallow in a right Path. The Holder may alſo make ſome Alteration in the going of the Plow by the Handles.

After thus repreſenting the Inſtrument, we have ſhewn it at Work, where the Manner of fixing the Horſes is ſeen. This Inſtrument therefore being, in this Manner, explained, we ſhall enter upon its Uſe, together with that of the Drills before deſcribed; that is, on the Practice of Drill and Horſehoeing Huſbandry for the Service of which theſe Inſtruments have been invented.

BOOK VI. PART VI.

The Benefit of Drill and Horſehoeing Huſbandry, ſhewn in three Sorts of Crops.

CHAP. LX.

Of raiſing Turnips by the Drill and Horſehoeing Huſbandry.

AS we have now laid down the Theory of the Drill and Horſehoeing Huſbandry, and deſcribed the Inſtruments by which it is to be performed, we ſhall in this, and the two ſucceeding Chapters, reduce that Theory to Practice, and ſhew the Uſe of the Inſtruments in the Field.

We ſhall chuſe for the Inſtances of the ſeveral Methods of practiſing it, Turnips, Wheat, and Saintfoin: the moſt uſeful Root, the moſt valuable Corn, and the fineſt of the artificial Graſſes.

Each of theſe we ſhall mention ſeparately, and the Reader will recollect that, according to the Courſe laid down in our Plan, they are to be treated of generally in a ſucceeding Part of our Work,

Work, among other Roots, Corn, and Graſſes, they are here conſidered only as Inſtances by which to ſhew the Practice of this particular Species of Huſbandry and its Excellence.

Turnips are of ſeveral Kinds, and diſtinguiſhed by different Names, according to their Shape and Colour, but the principal Sorts that the Farmer has to do with, are the common round Turnip, the long, or Suffolk Turnip, and the yellow Turnip.

He plants theſe for the Food of his Cattle; and though it is but of late that this Root is got generally into the Field, yet the Advantage of cultivating it is ſo very great, and ſo very well known, that there is no Article in the Farmer's Profeſſion better worth his Regard; and there is nothing in which he may have more Benefit from the Drill and Horſehoeing Huſbandry.

Turnips thrive beſt in a light warm Soil: for this Reaſon they particularly fall in the Way of this Kind of Huſbandry, becauſe it is on ſuch Land it is beſt practiſed. The common Method is to allow two Pounds of Seed to an Acre, and to ſprinkle it on with the Hand.

They are ſown at two Seaſons. In Spring to produce Seed the ſame Year; and at Midſummer for the Food of Cattle in Winter.

Thoſe ſown for Seed are few in Compariſon of the others. A Part of the Seed is uſed for ſowing again, and the reſt is mixed with Coleſeed to make Oil.

In order to the Midſummer ſowing, the Land is to be plowed in May, and twyfallowed in June to make it fine, the Seed is then to be harrowed in; and thus they are raiſed in the common Method, and are ready for the Cattle in the Depth of Winter, and the Beginning of Spring.

In this Way of raiſing them they are very liable to be devoured by the Fly, and the Ground is to be often ſown over again.

When they come up too thick the Practice is to thin them with a Hand Hoe.

This is the whole of the Farmer's Practice in the common Way for raiſing of Turnips, but this is ſubject to many Inconveniences: we ſhall now ſhew the Method by the Drill and Horſehoe, which will be the better underſtood, and its Advantages the plainer ſeen, after this Account of the raiſing them in the other Way.

That the Farmer who ſhall try this Method upon Turnips may give it fair play, let him firſt fix upon a Field that has a proper Soil. The moſt favourable Land of all is ſuch as is light, ſandy, warm, and a little moiſt. On the contrarary the worſt is Chalk; but with good Culture they may be raiſed any where. If the Soil be ſhallow neither Turnips, Carrots, nor any other large-rooted Plants, will ſucceed ſo well as when it is deeper: and as the Soil nouriſhes Plants in a great Degree, according to the Care that is taken to break and divide it: this is another Reaſon why Turnips have a great and particular Advantage from this Method, becauſe none ſtirs or breaks the Earth ſo thoroughly, or ſo deeply.

For this Reaſon, when a Piece of Ground is intended for Turnips, of whatſoever Kind it be, it ſhould be firſt plowed up as deep as poſſible, and then, as thoroughly as poſſible, broken and divided to fit it for their Nouriſhment. If the Soil be in its own Nature light, this will do; but if it be a tough and heavy Piece of Land, other Methods are to be uſed to reduce it to Fineneſs; for unleſs that be done effectually, ſo that it may be kept fine, the Turnip will never arrive in it at its due Perfection.

Thoſe who would have Tillage anſwer the Place of Manures, will recommend nothing more in this Caſe, than the thorough breaking and dividing the Land by working; but we do not write to ſerve a Syſtem, but to ſerve the Farmer. Therefore although we are, in this Place, recommending the Horſehoeing Huſbandry, and propoſing the Excellence of it in raiſing of Turnips, yet we ſhall adviſe the Huſbandman to add, in Caſe of this tough Soil, the Benefit of Manures.

Let him lay on theſe in their proper Kinds, and in the due Quantities, as has been directed at large in the Account of Manures in a preceding Part of this Work. When he has, by this Means, converted a heavy Soil into a light one by the due Uſe of Manures, let him go to work upon it for Turnips with the Horſehoing Tools.

To give an Inſtance of what we mean. Suppoſe a Farmer has a Neceſſity of raiſing Turnips, and has nothing but a clayey Soil: in this Caſe Turnips will not thrive upon it, becauſe it is cold and tough. Let him throw on good River Sand, this will make it a Kind of Loam, in which State it will be lighter and dryer; and when he has made this Change in it, let him go to work and prepare it for his Turnips. The Horſehoeing Huſbandry, with the Aſſiſtance of this Manure, will produce them in great Perfection. Whereas it would have done it but poorly without.

There may be other Soils which have a Neceſſity of other Kinds of Manures, according to what has been before written on theſe Subjects, and in theſe Caſes let the Farmer act juſt as in the preſent. Let him firſt improve his Ground by the neceſſary Manures, and then proceed to the preparing it for this particular Growth. The Succeſs of his Turnips will make ample Amends for all his Trouble and Expence, and ſo he will find it in every other Kind.

For this particular Article, if his Land be light, it is fit for the Growth: if it be not, he muſt endeavour to make it light by Manures and Tillage; and if he have not Convenience of getting as much Manure as he could wiſh, he muſt make up the Deficiency by ſo much the more Tillage.

The Seaſon of ſowing Turnips for the Winter Service, is properly from the End of May, to the Beginning of August. The warmer the Soil the later they may be ſown; but in ſuch as want that Advantage, it is beſt to be early.

The great Diſadvantage of chalky Soils for Turnips is, that they grow ſlowly: and this, in their firſt Stage, is very deſtructive. The Turnip, before it gets its rough Leaves, is the Prey to many Inſects; and as it is longer in chalky Soils than in others before it gets them, there is the more Danger. This Plant grows much quicker in the new Method than in the old, and there-

therefore it is one of thoſe that have the moſt Benefits from it.

The ſandy Soils being warm make the Turnips grow faſt, ſo that they are ſooner out of this Danger: and the Horſehoeing makes the Earth imbibe and receive the Dews ſo plentifully, that there never wants Moiſture to the Roots, ſo that they are always in a Condition of growing with Vigour.

In the new Method an Ounce of Seed ſows as much Land as a Pound in the ordinary Way. In that Way the Turnips riſing at Random are, in a great Meaſure, to be cut up, but in this all the Seed that is ſown is for good.

CHAP. LXI.

Of the Diſpoſition of a Turnip Crop.

THE Turnip being a large-rooted and ſtrong Plant, ſhould be ſowed by the Drill Plow in ſingle Rows. We have ſhewn the Inſtrument which is to perform this; and Experience proves that the beſt Diſtance for theſe Rows is ſix Feet aſunder. Theſe large Intervals will appear a great deal of waſte Ground, but we have ſhewn already that the Turnips have the Advantage of it all; and they will evidence it by their Growth much better than we can by Words.

Turnips have been tried in double Rows, but they do not ſucceed ſo well, Mr. TULL made the Experiment, but found it unſucceſsful. He alſo ſowed them in ſingle Rows, with only three Foot Intervals, but that did not anſwer ſo well. He found that a Field ſowed thus, produced a much larger Quantity of Turnips than a neighbouring one of the ſame Extent, which was ſown and hoed in the uſual Way; but its Produce was not comparable to that of the ſingle Rows, with ſix Foot Intervals. When theſe Intervals are well wrought by the Horſehoe, and that to a good Depth, the Plants grow in a ſurpriſing Manner, and never ſuffer by Drought; the breaking of the Earth making ſo fit for the Reception of the Dews, that it is always moiſt.

In LANGUEDOC they have only four Foot Intervals between their Rows of Vines in their Vineyards, and they break the Earth between with a Hoe Plow drawn by Oxen. This has led them in that Country, where they very much uſe the Horſehoeing Huſbandry at preſent, to make the Intervals of the ſame Breadth: but their Turnips, by their own Account, have not come up nearly to the Size and Perfection of thoſe raiſed in ENGLAND, with ſix Foot Intervals.

According as the Seaſon promiſes to be dry or wet after the drilling, the Seeds ſhould be let into the Ground at a greater or leſſer Depth. When there follow Showers the Seed will grow, though but juſt covered with Mould; but in a dry Seaſon nothing aſſiſts the Shooting ſo much as the Seeds lying at ſome Depth, becauſe there it is in the Way of ſome Moiſture, that Part of the Earth never being ſo burnt up as the Surface.

A great Advantage of the Drill Method is, that the Seeds may be let into the Trenches at different Depths, ſo that whatever be the Seaſon ſome will be ſure to riſe. When the Seeds are thus lodged alternately ſhallower and deeper, it is always found that if there follow Rains, the ſhallow Seed is the firſt that ſhoots; but if it be dry Weather, that is up firſt which lies the deepeſt.

There is a great Advantage in having two Shootings of the Turnips in the ſame Field: we have obſerved that no Plant is ſo liable to Accidents when young, and by this Means, if one Crop ſhould be deſtroyed, there is another ſafe perhaps, without the Trouble of a freſh ſowing.

The ſame Advantage may alſo be obtained by ſowing a Mixture of old and new Seed, for the old is much longer before it comes up than the new.

The Farmer who underſtands the Nature of the Inſect that devours the young Turnips, will very well comprehend this Advantage; but to others it will need ſome Explanation. The Creature that does the Miſchief is a ſmall Fly. This comes in Clouds in innumerable Multitudes, and wherever the Swarm ſettle they eat away down to the Root, and deſtroy the Produce. When they have done this Miſchief they go away, and it is perfect Chance whether they come again juſt at the riſing of the ſecond Crop.

It is only while the Turnip is very young that it is liable to this Miſchief, and there is no Probability that two Swarms of theſe Creatures ſhould come each juſt at the Time when there is the Danger. If they keep away till the rough Leaves come the Crop is ſafe; and this, according to the preſent Method, is in a very little Time. The two Seed Leaves which are ſmooth, thick, and juicy, are the Food of theſe Flies, and no other Part.

When the Seaſon is favourable, when all the Seeds have ſhot, and no Miſchief has been done by Inſects, the Number of Plants will be too great. Precaution has been uſed to ſow more than need grow, becauſe it is natural to ſuppoſe ſome will be loſt; but when all riſe they muſt be thin'd.

The ſooner this is done the better. The Method is to pull up the worſt looking Shoots, and moſt where they ſtand thickeſt; it is idle to let theſe ſtand to exhauſt the Earth firſt, ſo that the earlier they are deſtroyed the better.

As to the Quantity to be pulled up, that will be determined by the Number that have riſen. The Turnips that are left ſhould ſtand at about ten Inches Diſtance. They will thus look thin while they are young, but they will ſoon ſeem thicker by their Growth.

When the Turnips have got ſome Bigneſs in Leaf, the Hoe Plow is to be brought in to plow up the Intervals. They may be wrought two and two if the Crop grow well. This gives them their Food from the new broken Earth moderately, from time to time, and it is better than to give them a great deal at once, and then leave them a great while without any Refreſhment. This alternate plowing of the Intervals is beſt for thoſe Plants, of whatever Kind, that are ſowed in ſingle Rows. But with all its Convenience and Advantage, it does not deſtroy the Weeds ſo well as plowing all in a regular Man-

ner, and at once. Therefore, when the Weeds are very rank that Method is preferable.

CHAP. LXII.

Directions for horſehoeing of Turnips.

IT is a great Advantage to make the Plow come as near the Rows as may be, without damageing them: and this may be done much cloſer when they are young than afterwards; when they are hoe plowed afterwards, and ſome Earth is neceſſarily left near the Rows unbroken by the Plow, a Man ſhould be employed to go and turn that by Hand, with a Hook or ſome other Inſtrument. The looſening of the reſt of the Ground will make this break ſo eaſily, that a good Labourer will do a great deal in a Day, and 'tis a vaſt Advantage to the Crop; this is a much better Method than to bring the Hoe Plow near them when large.

For many Plants, when drilled in ſingle Rows, the Method of working the Intervals alternately is very right, and where the Weeds do not make the other Method neceſſary, it is very eligible. Two Plowings in this Manner are only the Expence of one, and the Benefit is commonly ſufficient. The Plant that has abundant Nouriſhment from one Side, may diſpenſe with its being more ſparing on the other; and there are other Reaſons yet for this Practice. If the Plow, by coming very near the Plants, have cut and broke too many of their large Roots, 'tis only on one Side, and thoſe on the other Side will take in a ſufficient Supply of Nouriſhment, till new ones are puſhed there in the Place of others. The Ground being firmer, we may, in that Caſe, carry the Plow nearer to the Turneps without Danger of looſening them; and finally, when the Crop is large the Plow goes more readily to the Supply of firſt one Parcel and then another; if all have leſs Nouriſhment at a Time none are long neglected.

While the Turnips are ſmall, great Care muſt be taken that a Furrow is not left open near them, becauſe the Earth about them would become too dry; but when they have three Months Growth, and the Seaſon is advanced to Autumn, there is no more Hazard from this Article, becauſe not only they are grown ſtronger, but the Earth naturally becomes more moiſt. When the Froſts ſet in, the ſame Caution ſhould be obſerved, not to leave a Furrow open near them, leſt they ſhould, by that Means, be put more in the Power of the Weather.

The Seaſon in which they are ſowed will, in ſome Meaſure, determine whether the Intervals are to be plowed alternately or otherwiſe. If the Turnips have been ſown late this Method will do, but if early the Weeds will grow faſt, and the other Method of plowing them all in a regular Manner will be neceſſary.

It is ſurpriſing to what a Bigneſs Turnips will grow, by this Method of Culture. Seven or eight Pound Weight is not an uncommon Thing for a whole Field, one with another; and in very good Land, when the whole Practice has been rightly conducted, 'tis common to ſee them of fifteen Pound Weight or more ſingly. The Produce of an Acre of Ground thus planted with Turnips in ſingle Rows, with ſix Foot Intervals, is eaſily computed, and it will aſtoniſh any one not uſed to ſee the Effects of the Horſehoeing Huſbandry.

The great Uſe of theſe Field Turnips is to ſupply the Cattle with Food in the Depth of Winter and in Spring, till the Graſs gets ſome Strength. For this Purpoſe, as they are only pulled up as they are wanted, they often muſt ſtand till the Seaſon of ſowing Corn is advanced too far, or is abſolutely over. This is a very reaſonable, and a very great Objection againſt the Turnip in the common Way, but in this Method of the Horſehoeing Huſbandry it is none. The Ground in the Intervals may be ſown: the Turnips may ſtand as they are moſt uſeful, and they will get nothing but freſh Advantage from the repeated Tillage of the Ground in the Intervals.

The very plowing for the Sake of the Turnips, has kept the Intervals in excellent Order, and they may be ſown in the Middle with Corn in treble Rows, at the Diſtance of ſeven Inches, Row from Row; in which Caſe there will be ſufficiently broad Intervals between them, which, when the Turnips are all taken up, will be ready for plowing for the Nouriſhment of the Corn.

Cows are very fond of Turnips, and they encreaſe their Milk. Sheep alſo eat them very greedily, and they are a wholeſome Nouriſhment for them: but Sheep ſhould have them while young, elſe they do not ſo well take to them.

Handhoeing of Turnips, which is all that can be done according to the common Practice, is but a very poor Method at beſt, and it is generally ſo ſlighted over, that the Farmer is extreamly cheated. The Hoers, inſtead of breaking all the Ground, tear up the Surface of one half, and draw it over the other, covering the Weeds with it, inſtead of hoeing them up: ſo that, inſtead of being deſtroyed, they are only made to grow the ſtronger.

Drilling upon the Level was the firſt Practice with Turnips, but it is a very bad Way. When they are drilled on Ridges the Hoe Plow may come near the Ridges, and go deep without Miſchief, but in the other Way the young Turnips are often buried by the Earth falling over on the left Side of the Plow. Turnips planted on Ridges, at ſix Foot Intervals, have been found to yield double the Quantity with thoſe planted on the Level, with three Foot Intervals: and when every other Article is the ſame, the Produce is found, by repeated Tryals, to be much greater from the ſix Foot Interval, than the three Foot.

The beſt Method of ſowing by the Drill, is to let half the Seed fall into the Bottom of the Trench, which is to be four Inches deep; and the other half over it, at about half an Inch Depth, lying upon the Earth that has fallen in upon the other: and if half new and half old Seed be mix'd, as before hinted, and the drilling performed in this Manner, there will be no leſs than four different Shootings one after another; ſo that there will be four Chances inſtead of one, of their eſcaping the Miſchief of Inſects. It is

lucky for the Farmer, that as Turnips are liable to this Accident, the Seed is ſo ſuited to the Purpoſe of preventing it. For Turnip Seed will bear to be buried very deep, and come up well; and by this Method of mixing the Seed, and ſowing at two Depths, there will be new Quantities riſing for a Fortnight together.

If all theſe Chances do not prove ſufficient, the young Turnips may be hoe plowed when they are in the greateſt Danger, which will bury a great Part of the Inſects; or at the worſt another Row may be drilled in, without doing any thing more to the Land.

When the Land has been well prepared, and made very fine, the Roller may be uſed with a great deal of Succeſs, upon a Turnip Field ſown by the Drill. We have mentioned already, in our Account of that Inſtrument, the great Advantage the Farmer has from it in the deſtroying Inſects; and there is no Kind that it more perfectly kills than theſe little Flies and their Brood, which prey upon the Turnips.

The Farmer often has Recourſe to his Roller in the common Way of Huſbandry, when he ſees there is Danger from the Fly; but in deſtroying the Inſect he ſpoils his Crop: for it makes the Ground ſo hard, that the Turnips, which require a looſe light Soil, cannot thrive in it. But in the Drill Way there is no Danger. The Ground may be rolled for the Deſtruction of the Inſects, and the Hoe Plow will ſufficiently break it up, and looſen it again. The right Method is to roll the Land acroſs the Ridges, after it is drilled. The Turnips may be after this thinn'd at a ſmall Expence, by Hand Hoes; and the Hoe Plow will then work wet or dry, and if they have been ſtopped a little in their Growth by the rolling, they will preſently revive and recover after this Practice.

CHAP. LXIII.

Of the Quantity of Seed, and Advantage of the Crop.

IN general three Ounces of Seed, or between three and four, is the right Quantity for an Acre of Ground, ſometimes two Ounces will do: and in the uſual Way, although we have mentioned two Pound, many uſe three or four.

The Farmer may leave the Ridges, when the Turnips are drill'd in ſingle Rows, with ſix Foot Intervals, higher than he can for double rowed Crops; becauſe there will be more Earth in the Intervals.

When the Turnips are planted in ſix Foot Rows, Wheat may be drilled between them; and in the ſame Manner Turnips may be drilled in between Rows of Barley, and Rows of Oats very ſucceſsfully. In theſe Caſes, the poorer the Land is, the wider ſhould be the Interval.

When Wheat is ſown between Rows of Turnips the Method is this. At Michaelmas, when the Turnips are full grown, a Ridge is to be plowed up in the Middle of every Interval, and the Wheat drilled on it: and then the Turnips are to be pulled up toward Spring, and carried to the Cattle.

In the thinning of the Turnips Regard muſt be had to their Appearance, and thoſe well growing ones which the Farmers call Maſter Turnips, muſt be left two together, if they happen to ſtand ſo, leaving the greater Space on each Side of them. But if three grow together the middle one ſhould be pulled up.

When Turnips have been ſown late, the alternate Hoeing deſcribed before, will ſometimes do; but for ſuch as have been ſown early it will be neceſſary to hoe them again. The beſt Inſtrument for breaking the Earth left about the Edges of the Rows by the Hoe Plow, is what they call, in ſome Places, the Prong Hoe; this has commonly two, ſometimes three Teeth, and that with three is beſt: but this Inſtrument muſt not be uſed till the Turnips are of ſome Growth.

When the Intervals are hoed alternately, the Plow may go deeper and nearer the Row, becauſe it is ſupported on the other Side, but this is only to be done when the Plants are ſmall: at that Time it is very beneficial, but afterwards it would be dangerous. At the laſt Hoeing it is a good Method to leave a broad deep Trench in the Middle of each Interval.

The Crop of Turnips has a vaſt Advantage when raiſed this Way, over thoſe by the common Method of ſowing, in that they are better able to bear a dry Seaſon. The Hand Hoe does not go deep enough to do any Service againſt this Accident, which ſpoils many a promiſing Crop: but the Horſehoe breaks the Soil to ſuch a Depth, as ſaid before, that it always keeps moiſt.

We have adviſed the Farmer before, to the Uſe of Manures for his Land intended for Turnips; and even Dung is allowed to be uſed for this Crop, by Mr. Tull its great Enemy, becauſe he acknowledges that Dung and Tillage together, will divide and break the Land in leſs Time than Tillage alone; and this is a very neceſſary Article in the Conſideration of Turnips, becauſe they have ſo ſhort a Time to grow.

The ſame Miſtake may naturally happen in judging of Turnips ſown in ſingle Ridges, with theſe large Spaces, as we ſee People run into about Corn drill'd the ſame Way; that is, they may ſuppoſe fewer ſtand upon an equal Space of Ground; but here it is eaſy to confute the Suſpicion by counting. The beſt Judges of Turnips leave only thirty to a ſquare Perch when they have been ſown in the common Way, but when they are drilled with Intervals of ſix Foot, there may be five and forty left upon every Perch of Ground, and each will be much larger than thoſe of which there are but thirty in the common Way. This has been proved by Trials, and is a Fact againſt which there can be no arguing, ſixty may be left in a Perch, and they will thrive very well; and allowing theſe only at five Pounds apiece, they will make a Crop of above eighty Quarters to an Acre.

When Turnips are drilled late, and it is upon a poor Ground, they will not be able to grow very large, and therefore the greater Number is to be left. For the ſame Advantages that would, in more Time, make a ſmaller Number grow big,

big, will ſupport a greater Quantity of ſmall ones, and their Number will make Amends for the Want of Size in every Particular.

CHAP. LXIV.

Of raiſing Wheat by the Drill and Horſe-hoeing Huſbandry.

AS Turnips are beſt raiſed in ſingle Rows, becauſe of the Largeneſs of their Roots, Wheat is found to ſucceed beſt in treble Rows, with ſufficient Intervals between one Set of Rows and another. We have ſeen the Advantage this Method of Tillage has, in Reſpect of Turnips, over the common Practice, but its Benefit with Regard to Wheat is greater.

The longer any Plant is to remain in the Earth, the more Nouriſhment it will require, and Wheat is three Times as long in the Ground as Spring Corn; being ſown in the preceding Autumn.

The Farmer knows that it will want a great deal of Nouriſhment in this long Growth; and therefore he dungs his Land to give it; and never ſows Wheat but on Land thus prepared, and well tilled beſide. He thus gives it a great Fund of Nouriſhment, but it is all laid in at once; now it would certainly be better to afford it this Supply at Times, as it continued growing. This repeated Aſſiſtance cannot be given it in the common Method, but it may in the Horſehoeing Huſbandry; and it is therefore plain this Practice is particularly well ſuited to that Kind of Corn. Reaſon confirms this, and it is ſupported by Experience, for Crops of Wheat upon the ſame Ground are much larger when raiſed by this Method, than by any other.

The Earth is prepared for Wheat in Autumn, but it is in Spring it wants moſt Nouriſhment, for then it begins to ſhoot; but by that Time the Ground has got almoſt into its original Condition again.

When the Farmer is preparing his Land for Wheat in the Horſehoeing Method, let him take Care of all Things to free it from Graſs. Other Weeds may be deſtroyed by the Methods uſed in that Practice, but this very difficultly. Other Weeds may be got out when among the Rows; but Graſs cannot, and it is ſo pernicious that one Bunch of it will ſpoil a Yard of the Crop.

The Ridges for the drilling of Wheat ſhould be made ſtrait and equal; the Plowman who underſtands his Buſineſs knows how, by ſetting up a Mark, to carry on the Line quite ſtrait: and to make theſe Ridges even he needs only mark out ſeveral of them, before he begins. But if the Piece be of ſuch a crooked Form that the Ridges cannot be plowed ſtrait the firſt Time, it may be proper to drill it upon a Level, and all the Ridges for the next Crop may eaſily be made equal.

Six Foot Ridges, being in Number eleven on the Breadth of an Acre, they ſhould be made lengthways of the Field, unleſs there be ſome Reaſon to the contrary: as if it be a Hill any thing ſteep. In this Caſe they muſt go up and down, whether that carry them lengthwiſe or breadthwiſe of the Piece: for if the Ridges ſhould go acroſs ſuch a Hill, they could not be well Horſehoed.

As to the Height of the Ridges, the various Nature of the Ground makes a great Difference, but as Wheat always ſucceeds beſt when it is dry, a Foot may be given for a general Height as a Medium. When they are narrow with this Height, and have a deep Furrow on each Side, the Water that Rains throw upon them ſufficiently moiſtens the Ground for their Service, and runs off without poaching them.

The deeper the Soil is the higher the Ridges may be conveniently made, and the wetter the Land is the higher they ought to be. In ſhallow Soils the Ridges cannot be made ſo high, becauſe there would be a Deficiency of Mould in the Intervals. But however high the Ridges are made, the Tops of them muſt not be ſo narrow and ſharp for drilling of Wheat, as they are for Turnips, becauſe the Wheat is to ſtand in a treble Row, whereas the Turnips do beſt in ſingle Rows. And a ſingle Row taking up leſs of the Breadth, may have more of the Ridges Depth, becauſe it leaves the Interval wider.

As there is this Difference in the ſowing of Wheat by the Drill Way, ſo there is to be a great deal in the reaping, for the Stalks are to be cut off cloſe to the Ground. This could not be done in the common Method, but it may very well in this, becauſe all the Plants riſe regularly in the Rows together.

When this is done, and the Crop is carried off, if the Trench in the Middle of each wide Interval have been left as deep as it ought by the laſt hoeing, as ſoon as may be, the Farmer ſhould take a common Plow to the Ground, and go as near the Stubble as he can; and turn two large Furrows into the Middle of the Intervals. This will make a Ridge over the Place where the Trench was.

If the Trench have not been left ſo deep as it ſhould be, then he is to go firſt in the Middle of it with one Furrow; which, with two more taken from the Ridges, will be three Furrows in each Interval. This plowing is to be continued as long as the dry Weather laſts, and then the Plowman is to finiſh, by turning the Partitions on which the laſt Wheat grew, up to the new Ridges. This is uſually done at two great Furrows: and theſe laſt Furrows, which compleat the Ridges, may be plowed in wet Weather.

Sometimes more Furrows will be required to make a ſix Foot Ridge very high. Thus when the Middle of the Intervals are very wide and deep, there will require ſix Furrows to the whole Ridge, and they muſt not be ſmall ones. The Seaſon alſo, in this Caſe, makes a Difference, for when the fine Mould is very dry, a great deal of it will run to the left Hand before the Plow, and more will run back again to the left, after the Plow is gone paſt.

When ſuch Ridges have been made for Wheat, and the Seaſon continues too long dry for planting it, and the Stubble not thrown up, let the Farmer then plow one deep Furrow on the Middle of each Ridge, and then plow the whole Ridge at four Furrows more. This will raiſe it very high. This Practice ſtirs all

the Earth of the Ridges, and is done at five Furrows.

This is a very important Article of the Farmer's Concern in the Drill Huſbandry, but he may be guided in it with great Safety by a few general Rules. The Furrows neceſſary for raiſing of Ridges muſt be more or fewer in Regard to the Bigneſs of them. The Plowman, as well as his own Reaſon, will inform him that ſix ſmall Furrows may be leſs than four large ones.

'Tis beſt not to plow the Stubble up to the Ridges till juſt before planting; eſpecially in the early plowing, becauſe that will hinder the replowing of the firſt Furrows, which, if the Seaſon continues dry, may be neceſſary. This may be done by opening one Furrow in the Middle, or by opening two, and afterwards the Ridges are to be rais'd up again. When they are become moiſt enough at Top, the old Partitions being plowed up to them, they are to be harrowed once lengthwiſe, and then drilled.

The old Partitions muſt be plowed up to the new Ridges, to ſupport their other Earth from falling down with the harrowing and drilling, which would elſe make them level.

The Ridges in this Way of managing Lands, greatly excel common Ridges of the ſame Height, becauſe, being made upon the open Trenches, they conſiſt of new tilled Mould from Top to Bottom; whereas the others, though as deep in the Mould at the Tops, have little of it tilled at the laſt plowing.

All other Sorts of Grain ſucceed beſt when they are ſown at a Time when the Ground is ſo dry, that it can be broke into moſt Parts by the Plow, but Wheat is an Exception. The Reaſon is, that Wheat is to ſtand the Severity of a Winter, and in order to this the Ground muſt fall cloſer upon it, and it does ſo when ſomewhat wet at the Time of the ſowing.

As a general Rule we may tell the Farmer, that in this Method of Huſbandry eſpecially, it is beſt to plow the Ground when it is dry; and then let it lie till it become moiſt. If this does not happen under ſeveral Weeks, he ſhould ſtay for ſuch an Opportunity. But in ſpeaking of this Dryneſs and Moiſture of the Ground, we are to be underſtood as meaning in Moderation: the Land need not be ſo dry as to fly like Duſt for the plowing; nor ſhould it be as wet as Pap for drilling; but in a moderate Way on each Side.

Wheat is a very particular Kind of Grain. It is too tender to be ſown in a dry Time, as Rye may be. It requires the Earth to lie firmly about it in Winter, to ſupport its Roots; and it requires it ſhould be tender in Spring for their Paſſage. This is ſeen by Experience; and there is no Way to give it theſe Advantages, like ſowing it by the Drill, in Earth that has been well broken by the Plow, and is become a little moiſt; and afterwards breaking the Earth all about the Rows in Spring by Horſehoeing.

After Rain, when the Ground is of a right Degree of Moiſture for drilling of Wheat, let it be harrowed with two light Harrows drawn by a Horſe, going in a Furrow betwixt two Ridges. This will be ſufficient in moſt Caſes, the Furrow being juſt broken to level or ſmooth it for the Drill.

If the Ground whereon the next Crop is to ſtand be plowed dry, the Farmer may drill at any Time during the Seaſon for ſowing the Kind of Wheat he uſes in the common Method, but it is better to drill a little earlier than the Farmers ſow in the common Way, than later. The Seaſon for ſowing by the Drill, in general Terms, may be ſaid to laſt from Harveſt to the Beginning of November.

When Wheat is drilled early leſs Seed is required than when late, for leſs of it will die in the Winter. The Farmer is alſo to conſider the Nature of his Land, in proportioning the Quantity of Seed. More of the Plants will die in Winter on poor than on rich Ground, and he muſt therefore allow more Seed to poor Land, than he does to rich, to provide againſt this expected Accident.

When the Farmer has a rich Piece of Land, and drills it early, he is to uſe leſs Seed than on any other Occaſion, becauſe every Grain, in a Manner, will come up, and very few of the Plants will die: and in this Way of Huſbandry, a few Plants thriving well will ſend out a Multitude of Stalks, and bear an Abundance of Ears: ſo that the Number of Seeds ſown is not the great Conſideration. Let the Farmer alſo regard, as we have before obſerved, the Size of the Seed Wheat: for its Number, not the Bulk, is to determine his Quantity. The ſmalleſt Grain of Seed Wheat will produce as large a Stalk, Ear, and Corn as the biggeſt.

On rich Land ſown early by the Drill, four Gallons of middle ſized Seed Wheat is ſufficient for an Acre. But in general, ſix Gallons in the common Run of Land, is the beſt Quantity. A great deal depends upon this ſuiting the Quantity of Seed to the Land and the Seaſon, for if the Corn be drilled too thick, it will be in danger of falling, and if too thin it will be ſubject more than otherwiſe to Blights. We mention the Danger either Way, that the Farmer may be upon his Guard, and we have given him all the neceſſary Rules for conducting this important Matter; a little too much, or a ſmall Matter too little of the Seed is not ſo very miſchievous, but we have ſhewn him what happens when it is much wrong either Way; and he is to take Care accordingly.

As to the Depth of drilling the Wheat; it may be done from half an Inch to three Inches; but when it is planted too deep it is in Danger of being eaten off by the Worms in Winter; this it eſcapes if ſhallow, becauſe they do not lie near the Surface in the ſevere Weather.

Juſt when the Wheat begins to peep above the Ground, let the Farmer beware of the Rooks. They will perceive it ſhooting before he ſees it, and that is the Time they attack it. Let him keep them off the Field for about ten Days at this Period, and all will be ſafe, the Corn will then be exhauſted of its Flour, and they will not ſeek it.

The later Wheat is drilled the more it is in danger of the Rooks, for if it be done ſoon after Harveſt, while there lies a good deal of looſe

Corn about the Ground, they will not trouble themſelves about that which is buried.

CHAP. LXV.

Of the Number of Rows for Wheat.

WE have ſhewn the Method of plowing and preparing the Ground for the drill and horſehoeing Huſbandry, and the Quantities of Seed Corn neceſſary under the different Circumſtances for ſowing it. We now come to a very material, and very important Conſideration; which is, the Number of Rows that are to be allowed to the Intervals.

We have obſerved already, that the drill may be made to ſow in ſingle, double, treble, or other more numerous Rows, according to the Farmer's Pleaſure. We have ſhewn that in Turneps the ſingle Row is preferable; but in reſpect to Wheat, that Point is not ſo well determined.

Experiments have been made of various Manners; and it is from the Reſult of them we are to determine. Some have ſown Wheat in a ſingle Row, and left the full Interval for Horſehoeing between; others have drilled it in Multitudes of Rows, with few or no Intervals of any Space between them; but theſe are the Extremes, and are equally wrong. In the Make of the Drill Plow for Wheat we have contrived for the Sowing it in three Rows, which is a very good Method; but ſome prefer to this the Method of only two Rows; and they have in many Circumſtances a great deal to advance in their Favour.

Of this the Farmer may be ſure, that one of theſe two laſt Methods he is to prefer; whether it ſhall be that by the double, or by the treble Row, he muſt determine from the Nature of his Ground. If he drill in treble Rows, the Partitions muſt be ſeven Inches; if in double, they ſhould be ten.

Where there is only a double Row, the Weeds are eaſier deſtroyed between; but then in the treble Rows there ariſe fewer of them. It muſt be allowed, that in the treble Rows Weeds are not ſo eaſily rooted up, without damaging the Corn; in the double Row there is leſs Hazard: therefore the Farmer will ſee, that if his Ground be very liable to Weeds, all other Conſiderations being equal, it will be beſt to ſow it in double Rows; if it be naturally pretty free from them, it will be beſt in treble Rows. This is what we mean by adviſing him to conduct himſelf according to the particular Circumſtances of his own Farm; and this in all Articles is very material.

In Favour of the double Row way, it is farther to be obſerved, that the Hand Hoe cannot work nearly ſo efficaciouſly in two ſeven Inch Partitions as in one of ten Inches: and the Quantity of Earth to be wrought by the Horſe Hoe is more when there is only a double, than when there is a treble Row.

A leſs Depth of Mould on the Ridge will do for the double than for the treble Row; and this will ſerve as a Direction in reſpect of the Farmer's particular Circumſtances.

Six Foot Ridges are abſolutely neceſſary to the treble Rows, but not to the double, becauſe the Partition between the two Rows can be very well clear'd, and well wrought, by the Hand Hoe; and the Earth of the Interval is wrought with much more Eaſe and Convenience: and let the Farmer obſerve farther, that in deep and rich Land theſe Intervals between double Rows may be much narrower than they can be made with Prudence in poor Lands, eſpecially when planted in the treble Rows. The wideſt Intervals of all are required for treble Rows of Wheat in poor Land; in other Reſpects the Farmer is to conſider the richer and deeper the Soil, the leſs will do between the Rows; and let him take in the Aſſiſtance of Manure, to make it more rich, and then it will do in ſtill leſs Quantity. He will find it beſt not to oppoſe the new Method againſt the old, but to join them for his Convenience.

The Management of the Hoe Plow is a very great Article; and the Farmer muſt take Care he employs an expert Plowman. The Intervals ſhould never be too wide to be horſehoed at two Furrows, without leaving any Part unplowed in the middle of them; and the Farmer will find, that by making the Plank of this Plow ſhort, and the Shafts crooked, ſo far as each will bear, he will be able to hoe with it in narrower Intervals than he may at firſt imagine, without damaging the Wheat.

When the double Row is uſed, there may be fourteen Ridges in an Acre; there will then be only one Partition on each that is between the two Rows; and its Breadth is ten Inches.

This Method brings the new Huſbandry nearer to the old: And as we ſhall adviſe the Farmer, in all reſpects, to come as near as he can toward uniting them, we ſhall adviſe him to harrow the Land, after Drilling, with the common Harrow; it will cover any of the Seeds that may chance to have been left bare by the drill Harrow, and encreaſe the Growth.

The hand hoeing between theſe double Rows is very eaſy; but let the Farmer ſee that it is done properly, and not ſlighted over: In the doing of this, the Earth muſt never be turned toward the Wheat; for it may cruſh the Wheat while it is ſo young and tender, as at this Operation, and the Partition would never be hoed clean.

The Hoes for this uſe ſhould have the Edge ſeven Inches long, and be four Inches deep from the Handle; they muſt be thin, and well ſteel'd; and this Work, at a moderate Price of Labour, may be done at about eighteen Pence an Acre, the working People finding their own Tools.

For the Wheat that is drilled in three Rows, four Inch Hoes are more convenient.

In low Ridges, when there are three Rows, the middle one is poor; in high Ridges it is as good as the others; but the Queſtion remains, whether it is not rich at their Expence: perhaps as much is loſt in them as is gained in that. Mr. Tull himſelf became of this Opinion, and changed at laſt his Method from the treble Row to the double. Whether or not he was in the Right we would have the Farmer find not by reaſoning and arguing, but by Trials on different kinds of Land.

Peaſe may be drilled by the ſame Drill as the Wheat, when it is made for the double Row, only

only the Spindle ſhould be changed for one that has the Notches a little bigger. This two Row Method for Peaſe is preferable to any other, becauſe the Earth may be thrown ſo far upon the Peaſe in the ſecond Horſehowing, that the two Rows become one, which is very convenient. If Barley be drilled, the three Row Method is preferable to the two; but this is not proper to be followed by a Crop of Wheat, without a Fallow. There is the ſame Objection againſt Oats alſo, becauſe ſome of their ſcattered Seeds will live out the Winter Riſe among the Wheat, and hurt the Sale.

CHAP. LXVI.

Of the Manner of Horſehoeing of Wheat.

WE have left the Point between the double and treble Rows undetermined, becauſe each Way ſucceeds very well, and ſome being of one Opinion ſome of the other, among thoſe who have tried: there ſhould be more Experience to determine which is in general the beſt; but which ever Way be preferred in that Reſpect, the Practice of Horſehoeing is the ſame, altho' that of Handhoeing differs.

The firſt Horſehoeing is to be performed by turning a Furrow from the Row; and when the Weather is wetter when this is performed, the Plow may go nearer the Row, without Miſchief; and when dryer, it muſt be carried ſomewhat more diſtant.

As to the time of doing this, it is beſt when the Wheat has got three or four Blades: but it ſhould never be done till it have more than one Blade. If the Crop have been drilled early, it muſt be done before, or in the Beginning of Winter, according to the Condition of the Blade; but when it has been drilled very late, it need not have the firſt hoeing till Spring. In this firſt hoeing let the Farmer have a ſtrict Eye upon thoſe he employs, for a great deal depends upon it. Let him ſee that they go as near the Rows as they can do, without damaging the Corn; and as deep as they can, without going below the good Soil.

If upon looking over the Ground afterwards, he finds that the firſt Furrow was not near enough the Rows, nor deep enough, let him order a ſecond Furrow to be plowed at the Bottom of the former; and if this cannot be conveniently done ſoon after the firſt hoeing, let it be done before the Ridge is turned back in the Spring. And let the Farmer remember always to have the Furrows turned up, to make Ridges in the middle of Intervals, during Winter.

Let him not be afraid of expoſing his Rows of Corn to the Froſts, by hoeing off the Earth from them in the Beginning of Winter; for it is found by Experience, and there is no arguing againſt that, that when the Hoe has gone neareſt, the Plants thrive beſt.

The Row in this caſe ſtands, as it were, upon the Brink of a perpendicular Ditch, and the Water therefore runs off from it; and we know dry Earth is not affected by Froſt like ſuch as is wet. The Plants are thus preſerved during Winter; and in Spring the Ridge from the middle of the Interval is thrown upon them, which is full of new Nouriſhment, having lain all this Time in the manner of a Fallow, altogether unexhauſted.

As ſoon as the Froſts are paſt, and the Weather will allow it, let the Intervals have their ſecond turning: this is called the Spring hoeing. The Ridge from the Middle of the Interval is then to be thrown, as before obſerved, to the Rows on each Side, by two Furrows, as near as can be done without covering the Wheat.

After this Spring hoeing, the Farmer is to be guided in what he does by the Circumſtances and Nature of the Land, and by the Weather. The great Cautions he is to have, are never to let Weeds grow to any Height in the Intervals; and never to let any unmoved Earth lie in the Middle of the Intervals long enough to grow hard.

By theſe two Meaſures, he will be guided in his Work during the Summer; and theſe are to direct how many Hoeings the Intervals are to have, better than any general Rule; only let him obſerve, that he muſt never plow deep near the Rows in Summer, when the Plants are grown large; but, at the ſame time, let him take Care to plow as deep in the Middle of the Intervals as the Soil will allow; and let him turn the Earth towards the Wheat, eſpecially at the laſt hoeing, ſo as to leave a deep and wide Trench in the Middle of each Interval.

This is the Method of raiſing Wheat by the Drill and Horſehoeing Huſbandry. Whether the Method by two or by three Rows be the beſt, muſt be determined by more Tryals on Lands of different Kinds and Natures; but whichever of theſe be taken, the Advantage of the Horſehoeing ſhews itſelf in an aſtoniſhing manner. The Crop is vaſtly greater than any other Way; and it is increaſed by augmenting the Number of Stalks of Ears and of Grains.

The Stalks, inſtead of two or three, are thirty or forty from each Grain; and whereas a great Part of the Stalks in the common Huſbandry do not come to ear; and of thoſe that do, a great many have Ears very ill fill'd, in this Method, with the Advantage of Horſehoeing, all the Stalks come to ear, and every Ear is full of good Grain.

There is no way of producing a large and full Grain in the Ear like late Horſehoeing. If this be done juſt when the Wheat is gone out of Bloſſom, the whole Stock of Nouriſhment that it conveys is carried up directly to the Grain, and the Crop will be doubled by this Method.

It is by theſe Means that the Horſehoeing Huſbandry produces a greater Crop than the common, from a tenth Part of the Plants; for it increaſes the Number of Stalks; it carries them all up into Ear; it makes the Ear large; and the Grain plump, and full of Flower. This it will always be found upon Examination to effect; and the Conſequence is here very plain. Fourſcore Ears have been counted upon one Plant; and there have been numbered a hundred Grains in one Ear. If the Wheat Plant be capable of this vaſt Increaſe and Product, there is an ample Field for the Improvements that may be made by any Method of Huſbandry, which ſhall better than the others promote its Growth.

CHAP.

CHAP. LXVII.

Of the immediate Benefit of the broad Intervals.

WE have obſerved that the Generality of Farmers are averſe to the broad Intervals neceſſary to be left for the Horſehoeing, and the Prejudice is very natural: it ſeems leaving ſo much of their Land unoccupied. We have before ſhewn that this is a Miſtake; but it is here that we may moſt abundantly prove it, arguing from Experience.

We ſee a Plant of Wheat is capable of a vaſt Encreaſe; and if we aſk how it is to be promoted in that Augmentation, the Anſwer is very plain, for it can only be by giving it more Nouriſhment. There are two Ways of doing this, the one by making the Earth richer, and the other by allowing more Compaſs of it for the Roots to run in. The firſt Method is done by adding Dung and other Manures; the other by leaving theſe broad Intervals, and tilling them with the Hoe Plow. The latter Method will ſucceed much better without the former, than the former can without that; but they will have their fulleſt and fineſt Effect when they are uſed together.

To ſhew the Advantage however, in its faireſt Light, we will at preſent conſider the Horſehoeing Method, with the Advantage of its wide Intervals alone, and without the Aſſiſtance of any Addition.

We ſee then that we can, by allowing wide Intervals between double or treble Rows of Wheat, produce a good Crop with leſs Labour and leſs Seed than are needful in the common Way, and without the Expence of Dung, or the Loſs of Time in fallowing. Theſe are plain Advantages: there is no Difficulty in the Practice: and we hope therefore the Farmers in every Part of the Kingdom, where there is a proper Soil, will give it a fair Trial.

If it be ſuppoſed that the Roots of Wheat do not extend ſo far as half Way of theſe broad Intervals, we have ſhewn already that it is aſſerted upon Conjecture, and is moſt likely to be an Error; and even if it were true it would amount to no Objection of Weight: for this Breadth is abſolutely neceſſary for the working of the proper Inſtruments; and at the laſt hoeing the Earth is thrown on each Side toward the Rows, and a vacant Space left in the Middle of the Interval, ſo that they certainly then have the Benefit of it all, and that is the Time when they moſt of all want it. There is, at this Time of the Growth, no Part of the Earth of the Interval diſtant above ſeventeen Inches in the double Rows from the Plants, or above two Foot from the middle Rows, when there are three. Thus far the Roots of Corn may be proved to reach, and the Earth is given them new tilled, and full of Nouriſhment for the feeding of the Ear.

We have ſaid that in deep Land the Intervals may be narrower than in ſhallower; but ſtill they muſt be wide enough for the Inſtruments to work in it; and if in ſhallow Land they ſhould be narrow, there would not only want Room to work, but Earth to work upon.

The Practice of Horſehoeing will ſupply the Place of Fallowing and of Dung; but there muſt be Earth for it to work upon: therefore there muſt be a ſufficient Breadth of Interval, and a ſufficient Depth: if the Intervals be ſo narrow that nearly all the Earth of them goes to make the Tops of the Ridges, there will not be enough to ſupport the Plants, let it be ever ſo much improved by Tillage. There muſt be a Quantity of Land as well as Quality, for the ſupporting of a Crop; and as Land is cheaper than the Expence of Manure, why ſhould not the Farmer who regards his own Intereſt allow it.

Weeds are very apt to grow in the Intervals that are hoed, but then they are ſoon deſtroyed. They grow readily becauſe the Earth is greatly improved by Tillage; but as they are deſtroyed before they come to Seed, by the repeated plowing of the Intervals, the Damage is nothing. The Ground is not ſtocked with freſh Supplies of them, and they even add the Benefit of a Manure by rotting in the Ground.

It is plain that the Drill and Horſehoeing Huſbandry produce larger Crops in the ſame Piece of Ground, than the common, and at leſs Expence; and it is equally certain that this Advantage ariſes from the thorough breaking and dividing of the Ground in the Intervals with the Hoe Plow. The Neceſſity of allowing theſe Intervals a due Breadth is plain, becauſe the Work cannot be perform'd in them if too narrow; and becauſe they cannot ſupply the Rows ſufficiently, if there be not Subſtance or Quantity of Earth to work upon. The Advantage is certain, and the Neceſſity of Breadth in the Intervals is ſo plain, that at the ſame Time that we expreſs our Wiſhes that every Farmer would give the Practice a Trial, we hope none will attempt it without giving this due Compaſs to the Intervals, becauſe that would not be giving it a fair Trial; and the Importance is enough to beſpeak at leaſt Candour in the Experiment.

CHAP. LXVIII.

Of raiſing Saintfoin by the Drill and Horſehoeing Huſbandry.

WE ſhall, in a ſucceeding Chapter, conſider the Nature and Qualities of Saintfoin: we are here giving the Culture of it by the Drill and Horſehoeing Huſbandry, as an Inſtance of the Benefit of that Practice, and of the Extent to which it is capable of being carried in the Farmer's Profeſſion.

The great Advantage of Saintfoin is owing to the Length of its Root. This pierces to a vaſt Depth in the Earth, and will therefore ſupport a large Growth of it, where the natural Graſs would be little. This is its particular Benefit, and there is no Way of raiſing it equal to that by the Drill and Horſehoeing Huſbandry.

The drieſt and pooreſt Ground may, by a proper Management, be made to produce good Saintfoin, but the fineſt and beſt will always be had from the beſt Soil.

When the Farmer is about to raiſe Saintfoin, let him ſee to prepare his Land well for it; and then let him take Care to lay in the Seed carefully, otherwiſe very little of it will grow.

The Depth at which Saintfoin Seed is drilled, is a very material Conſideration. In moderate Land it ſhould be covered half an Inch deep, and in ſuch as is very dry and light a little deeper, but nothing is ſo dangerous as the burying it too low in the Ground. No Seed whatſoever is ſo unable to bear it: but though it requires to be covered ſo very little, yet it abſolutely requires to be covered: for if it ſhould be left naked upon the Ground, it would not ſhoot at all, or will periſh when it had juſt ſhot; we give the Farmer his full Cautions, and on his Regard to them will depend his Succeſs.

The Quantity of Saintfoin Seed to be ſowed by the Drill, is about a Buſhel to an Acre. This allows twenty Seeds, or thereabout, to each ſquare Foot of the Ground.

Let the Farmer be very careful in the buying of his Seed. It is often bad, and then, with all his Care, his Ground will be underſtocked with Plants.

The beſt Seaſon for drilling of Saintfoin is early in the Spring. It is a common Practice to ſow it in the Beginning of Winter, but that is very bad; and to ſow it in the Heat and Drought of Summer is worſe.

Laſtly, in order to have a good Growth of Saintfoin, let the Farmer ſow it alone. It is a common Practice to ſow it with Barley or Oats, and this is very wrong: ſome ſow it with Clover or Rye-Graſs, and that is worſe, it never ſucceeds perfectly, unleſs when it is let into the Ground without Mixture.

The Farmer who is uſed to ſowing of Saintfoin, in the common Way, will be ſurpriſed at what is here ſaid, with Reſpect to the Quantity of the Seed. Six or ſeven Buſhels to an Acre is the uſual Allowance in the ordinary Way; but in the ſingle Buſhel we allow in this Method, we compute for a great deal of bad among it, for a much ſmaller Quantity of Plants than would be thus rais'd from good Seed will be ſufficient. In general there is no Crop that ſo well bears to riſe thin as Saintfoin, for it grows larger and ſends out more Branches in Proportion as it ſtands more ſingle.

When Saintfoin ſtands the moſt ſingle, in Moderation, it will yield the largeſt Crops. It ſpreads its Roots to a great Depth and Diſtance, and a few well nouriſhed Plants are more than a great many that are but half fed. The common Length of the Saintfoin Stalks is two Foot or a little more; but when it ſtands far aſunder they will grow to ſix Foot.

The Root of this Plant is found to encreaſe in Length and Thickneſs, in Proportion as it is farther from other Plants; and as the Root encreaſes the Stalks always keep encreaſing. The greater the Number of Plants of this Kind there are upon a Piece of Ground, the ſmaller they are; and their Number never makes Amends for this Deficiency in their Growth. When there are but a few Plants upon the Ground, they will ſupport themſelves without Aſſiſtance, and encreaſe every Year in Strength and Produce; while on the other Hand, the great Number that are ſometimes raiſed by unſkilful People, while they produce leſs, require Manure or they will periſh.

From the Nicety required in laying in the Seed of Saintfoin, it is eaſy to ſee that the Drill Huſbandry is much better ſuited to its Produce than the common; but here is another Reaſon: we ſee that if the Plants ſtand too thick they are ſtarved, and yield little; but in this new Method they are in leſs Danger of this Miſchief, becauſe they are ſure of having Room on both Sides, though they ſtand thick in the Rows; if the Intervals be allowed a due Breadth: and there is no Crop which requires to have them larger.

When this Plant is kept at a due Diſtance, the ſecond Crop riſes immediately after cutting: but when they ſtand thick it does not ſhoot till there comes Rain. A moderate Diſtance is the planting about a hundred Plants on a ſquare Perch, and theſe will very well yield two Ton to an Acre.

If the Farmer follow our Direction of drilling his Saintfoin Seed early in Spring, and take Care to hoe it well afterwards, he will, if the Seaſon be favourable, have a Crop the firſt Summer: this he is not to expect in the common Method of Management, but this Way it will be a very pretty Addition to his Profit: and the Roots having Time to ſtrengthen themſelves in the Earth, by this early taking off the Head, will thrive the better for the ſucceeding Years.

On many Lands, in the common Way of Management, Saintfoin yields but one mowing Crop in a Year; but with right Management it will yield two very large ones.

There is no Plant that has more Advantage from hoeing than this. A Quantity of hoed Saintfoin will grow more in a Fortnight, than ſuch as is unhoed in the ſame Land will in ſix Weeks; and that which is hoed will be freſh, green, and ſtrong, while the other is poor and yellow.

From theſe general Obſervations we may lay down Rules for the Management of this beneficial Plant, which will be as certain of Succeſs as the Experience on which they are founded is true.

CHAP. LXIX.

Of the Manner of planting Saintfoin.

THE beſt Method for raiſing Saintfoin by the Drill and Horſehoeing Huſbandry, is to drill it in double Rows, with eight Inch Partitions, and with Intervals of two Foot and an half; and theſe Intervals are afterward to be hoed only alternately, leaving the other to make the Hay upon. The Benefit of Horſehoeing is very evident upon this Plant, for it makes it thrive exceſſively on very poor Land; and will cauſe it to yield two very good Crops, where it would otherwiſe have afforded but one, and that indifferent.

Leſs Horſehoeing is required for Saintfoin, than for any other Plant. In very good Land it may be omitted for two or three Years, but

when the Ground is pooter it muſt be repeated oftener; and whenever the Crop is ſeen to fade, this will refreſh it. While the Plants are ſmall Care muſt be taken not to cover them with the Plow, but afterwards there is no Danger.

We have ſaid that the Land muſt be well prepared for this Plant: and we are to add, that great Care is to be taken in the whole Operation of raiſing it. The Ground muſt be made perfectly clear of all other Growths, and well broke by Tillage; and Care muſt be taken that the Tines of the Drill Harrow exactly follow the Shares, for the covering of the Seed.

No other Harrow is to come upon the Ground after the Saintfoin is ſowed: nor is it to be rolled. Thoſe who ſow it with Barley muſt roll the Ground for the Sake of that Corn: but we adviſe the Farmer to ſow it alone, and then he is not to roll the Ground after it.

Let him take Care that no Cattle come near the Saintfoin when it is young, and in the firſt Winter let him give it a little Manure of Soot or Aſhes; this will greatly encourage its Growth, and the next Crop will very well pay the Expence.

This he will certainly find to be the Difference between drilling Saintfoin, and ſowing it in the common Way, that the Expence of drilling is hardly a twentieth Part of that in ſowing it the other Way, and that the Profit of the Crop is generally double.

We have obſerved that leſs Horſehoeing is neceſſary to Saintfoin than to any other Crop, when that Method of Huſbandry is practiſed; and it will be proper to add here, that this Plant will ſucceed extreamly well by the Drilling, without the Addition of the Horſehoeing Article. It may be ſown for handhoeing, or for ſtanding without any Kind of hoeing at all; but in both theſe Caſes the drilling is vaſtly preferable to the common Method of ſcattering in the Seeds at Random.

When Saintfoin is drilled for handhoeing, let the Rows be made ſixteen Inches aſunder; and the Plants ſingled out by the Hoer to about eight Inches Diſtance; but let the Hoers take Care to have the ſtouteſt and beſt growing Plants, though they happen in ſome Places to ſtand a little cloſer than the allowed Diſtance, leaving a Space proportioned beyond them.

When it is not intended to be hoed at all, either by the Hoe Plow, or by Hand, the beſt Method is to plant ſingle Rows, at eight Inches Diſtance, with no greater Quantity of Seed than when they are planted at ſixteen Inches. Either Way there will be a profitable Crop: but by what we have ſeen from Experience, the Horſehoeing and the Drill together produce the richeſt, the moſt profitable, and the moſt laſting Encreaſe.

CHAP. LXX.

Of the great Advantages of the Drill and Horſehoeing Huſbandry.

WE have now, in a plain and impartial Manner, laid down the Principles upon which the new Method of Huſbandry is founded; the Manner in which it is to be performed; and its Effects on three different Kinds of Crops, the Turnip, Wheat, and Saintfoin. The Farmer muſt, by this Time, very well underſtand its Nature, but it may be proper to cloſe the Account with a ſhort Recital of its Advantages; that what Reaſon ſhews him to be right he may find will anſwer alſo in Practice.

The Farmer, when he comes to count his propoſed Gain, ſhould take into his Conſideration four Things; the Expence of his Crop, the Value of it, the Certainty or Hazard, and the Condition wherein the Land will be left after it.

If the Profit of a Crop were to be computed ſingly from its Price at Market, that of the Drill and Horſehoeing Huſbandry would have the Preference greatly over that raiſed by the common Method: but we are to conſider alſo, that the Expence is greatly leſs; and then we ſhall ſee the Benefit in a new Light.

The Farmer may get more by a very ſmall Crop that coſts little, than by a much larger that he has been at a great Expence to raiſe; but in this Conſideration he has both the Advantages of ſmaller Expence, and greater Value.

All the Articles of Seed, Tillage, Drilling, Weeding, and Reaping, with whatever other leſſer Articles there may be in this Method of Huſbandry, do not amount to above the eighth Part of the Expence in the common Method: therefore, were the Crop much leſs, the Profit would ſtill be very greatly above that of the other: it is plain then how vaſt the Advantage muſt be, when it is as we ſee really greater.

When the Farmer ſhall impartially conſider the different Goodneſs of a Crop, that conſiſting in the Quality, as well as Quantity of the Grain, he will ſee his Advantage in a farther Light; for he will find that Wheat, the richeſt of all Corn, may be raiſed continually upon the ſame Land, and that the Grain will this Way exceed, in every Reſpect, that raiſed by the other Huſbandry. Not only Land will continue to produce Wheat every Year by this Management, but it will grow on Land that would not otherwiſe have yielded it at all, without an Expence of Manure more than equal to the Profit by the Crop; but in this Way of managing Land it will yield exceeding good Crops ſucceſſively, from Year to Year, with no Manure at all; and if a ſmall Expence be added for Manure, the Succeſs by the Aſſiſtance of both will be ſurpriſing.

The Certainty of a Crop by this new Method is much greater than in the old; and this Article of keeping the Farmer's Heart at reſt, during the Growth, is worth ſome Conſideration. In the common Way he often ſuffers by the Ear being too ſmall, by the Want of Quantity, and often from

from its being too large, by the falling. But in the new Husbandry the Ears are never too small, for the Horsehoeing supplies them with Nourishment just for the filling of them, and they are much less liable to lodge, because the Stalks are stronger.

If we lastly examine the Difference between the old or common Method of Husbandry, and this, in the Condition in which the Land is left after the Crop, there is no Comparison, for in the one it is exhausted, and in the other in full Strength. A Field that, after the Expence of dunging, has borne a Crop of Wheat, is not fit to bear another, but the Crop must be changed; and when it has borne two more of an inferior Nature, all the Work must begin over again, for it is exhausted, and will not bear any Crop without refreshing at this great Expence; or else it must be recruited by Fallowing. This is the Condition wherein Land is left after a Crop in the usual Way; but in the Method by Horsehoeing, when it has borne one Crop of Wheat, it is fit for another; and the two Furrows upon which the next Crop is to stand, may be plowed as soon as the other is off. No store Sheep are necessary, for there is no Use of a Fold where the Land has annually a Crop growing on it, and needs no Manure. The Farmer who follows this Method, can plow dry and drill wet, without any Manner of Inconvenience: he can sow early, because he can, in Spring, help the Staleness of the Ground by hoeing: and thus in every other Article he has a certain Advantage.

A poor Ground will produce Crops Year after Year this Way, without Manure or Rest, and they shall be all very good ones; no Decay nor Exhausting, but the Earth all the while improveing.

The Success of Horsehoeing is so evident in the giving Nourishment to the Crops, that there have been some who objected to it, as making the Growth too rank. There could not be a fairer Confession of the Excellence of the Practice: for that which is capable of giving too much Nourishment, may certainly be so managed as to give just enough. It is true, that when Corn is too rank it is liable to many Accidents from that very Cause; but it is in the Power of the Farmer to give it Strength and Vigour enough, without giving it too much; and it is in the most beneficial Things, that the greatest Moderation is necessary.

They say if this Method can enrich poor Land to such a Degree, as to make it bear great Crops of Wheat, it will naturally make rich Land too rank. In this Case the less of it may be used, but we have provided against such Objections already, by advising the Intervals to be smaller in rich, than in poor Ground.

There have been many Objections of the like Kind raised against this Method of Husbandry, but they are such as shew they have risen from prejudiced Persons, and such as were desirous of decrying the Practice rather than of giving it a fair Trial.

As these have been too violent against it, the Advocates in its Favour have been too extravagant in its Praise. Enough may be said in its Cause, without enlarging beyond the Truth, and he who goes farther, hurts the Point he means to serve.

We have, as carefully as we are able, proposed the true State of the Case between the old and the new Method, and of this at least we are sure, we have written with Impartiality. We have stated the Advantages to spirit up the Farmers of our own Country to make a Trial, and would see them influenced by that, rather than by any Arguments; but the Success and Advantage with which it has been used in FRANCE makes us earnestly desire it may have fair Play here.

If we were asked whether we think the most Advantage may be had from the common Methods, or from Horsehoeing without Manure, we should answer that doubtless it is from the Horsehoeing Method; but the greatest Advantage possible will be obtained by employing both together!

Having thus laid down at large the Manner of conducting the new Method of Husbandry, and the Advantages arising from it; we shall here add the Thoughts of a practical Correspondent, who has communicated them at large with Respect to the Improvement of Estates, and the Advantages of the new Husbandry; including, under that Name, the Introduction of the several Articles not used by the old Farmers, as well as the new Method of Tillage; and the Management of some particular Grains and Roots.

SIR,

The Improvement of Estates appears so plainly a general Advantage to the Nation, as well as a private Benefit to those who manage it with Discretion, that it would be superfluous to enlarge on a Point which seems in itself so evident.

For whoever encreases the yearly Value of his Estate, so far certainly encreases his own, and the yearly Riches of his Country, according to the Sentiments of a late Author, which may not be improperly applied on this Occasion; "He that makes two Chives of Grass grow where "but one did before, does his Country more "real Good than all the Generation of Politi-"cians together."

To the Profit arising from the Improvement of Lands, we cannot but add, two other very important Articles in Life, viz. Health and Pleasure; both which are the natural Consequence of such Undertakings, and are so great Ingredients in our Happiness, as justly to deserve the Attention of every wise and virtuous Mind.

Some Exercise is generally necessary to preserve the Health of the Body; and some Relaxation and Amusement, are equally beneficial to preserve and improve the Faculties of the Mind.

The Poet justly says,

"The Wise for Health on Exercise depend,
"God never made his Work for Man to
mend."

And this, perhaps, is the most justifiable Pretence for our Hare and Fox Hunting, so frequently fatal directly, or in their Consequences, to the Sportsmen, and so generally prejudicial to, and so often attended with the Curses of, their Neighbours.

And

And might not all the good Ends of ſuch Engagements be eaſily obtained, by viewing thoſe Improvements of an Eſtate, which, if diſcreetly managed, would be far from being expenſive, comparatively with the others; be a Bleſſing to the Neighbourhood by their uſeful Influence, by a virtuous Employment of the honeſt Induſtrious, procuring a laſting Encreaſe of Wealth to a Man's own Family, and perpetual Encreaſe of Riches to our Counrry.

Which Article of improving private Eſtates ſeems more particularly to require the Regard of thoſe Gentlemen, who, being debar'd by our Laws from encreaſing their Eſtates in Land, may be the rather induced and the more inclined to improve the Value of thoſe they are well intituled to; eſpecially as one Pound gained this Way, is generally worth near two of old Rents, as it is ſcarce ever loaded with additional Taxes or Aſſeſſment.

And how fine and pleaſing a Proſpect muſt it be, to ſee an Eſtate well laid out, and in good Order, well fenced, and tenanted, and the yearly Value thereof greatly encreaſed, as well as the Good of the Tenants promoted, with much leſs Expence than a Pack of Dogs, a Brace of runing Horſes, a ſhowy Houſe, or a pompous Piece of Water, would occaſion; but Cuſtom and Faſhion ſeem herein too much to prevail with Gentlemen, againſt plain Reaſon and good Senſe.

I ſhall only mention, after Cowley, one Delight more, the moſt natural and beſt natured of all others, a perpetual Companion of the Huſbandman; and that is, the Satisfaction of looking round about him, and ſeeing nothing but the Effects and Improvements of his own Art and Diligence; to be always gathering of ſome Fruits of it, and at the ſame Time to behold others ripening, and others budding; to ſee all his Fields and Gardens covered with the beauteous Creatures of his own Induſtry; and to ſee, like God, that all his Works are Good.

Indeed I cannot be ſo ſanguine as to think with that ingenious Writer, that if Perſons of tolerable Circumſtances ſerved Apprenticeſhips to this Art, "That we ſhould ſee as many Aldermen's Eſtates "made in the Country, as now we do out of "all Kind of Merchandizing in the City," yet I verily believe, that if our Gentry would turn their Thoughts to Subjects of this Nature, inſtead of ſome other Purſuits in vogue, it would ſave many a fine Eſtate, and preſerve many an antient Family from Ruin; and as to the plain Lucre of it, I have known ſome Inſtances where Perſons in very private Stations have gained ſome Hundreds a Year, by taking long Leaſes of uncultivated Lands, and only fenced and limed them well, and then ſet them out again; whilſt others have paid the Purchaſe Money of good Eſtates, by the improved Produce of the Lands; and I have known an Eſtate ſold at five and twenty Years Purchaſe, parcelled out in Farms at five and thirty, and ſome of thoſe ſold again at five and fifty, and they then brought in near five Pounds per Cent. and the Tenants then did as well as at firſt. Such an Improvement was made of the Value of the Farms, by only taking the Field Land into Cloſes by good Walls, and then improving them by Lime, or by Lime and Soil, or Dung in proper Compoſitions.

As to the Uſefulneſs of Engagements of this Kind to the Mind, as well as to the Health of our Bodies, I believe that I may venture to affirm, that I ſhall herein meet with the concurring Opinions of our beſt Phyſicians, as well as the general Practice of the moſt conſiderable Perſons of all Stations, who take all Opportunities of getting into the Country whenever their Affairs will permit, of which any Perſon near the Metropolis may be a daily, or at leaſt a weekly Spectator.

And whoever ſeriouſly conſiders that our Souls and Bodies are ſtrangely cloſely united, and wonderfully reciprocally affect each other, the Truth of which every Man's Experience muſt ſurely convince him of; though it exceeds the Wiſdom of the greateſt Philoſophers, to explain the Manner how an immaterial Soul, and a material Body can operate on, and influence each other after that ſurprizing Manner, conſtant Experience convinces us they do, and how neceſſary it is to preſerve a proper Tone, State, or Harmony of each, in order to preſerve the regular Operations of both. This will evidently ſhew the abſolute Neceſſity there is, from our very Nature, to have ſome Relaxation from, or Change of Employment, to preſerve that Health of Body, and thoſe Faculties of our Mind, which may enable us to preſerve both ſound enough to perform the neceſſary Duties of Life in our ſeveral Stations, and conſtitute what we call, a ſound Mind in a ſound Body; which whoever poſſeſſes, in Mr. Locke's Opinion, wants little elſe neceſſary to the Happineſs of this Life.

The Innocency of this Life, ſays Cowley, is the next Thing for which I commend it, and if Huſbandmen preſerve not that they are much to blame, for no Men are ſo free from the Temptations to Iniquity. And ſpeaking of Children being taught early to Dance, &c. he adds, But did ever any Father provide a Tutor for his Son, to inſtruct him betimes in the Nature and Improvements of that Land he intended to leave him?

I would not here be thought to engage Gentlemen in Huſbandry, as a conſtant Occupation, or to expect they ſhould hold the Plow, or fill the Dung Cart.

But can they, whoſe Health or Affairs require their Reſidence in the Country, employ their ſpare Hours in more uſeful, more innocent, or more delightful Engagements?

The Mind of Man muſt be employed, or will grow ſtrangely out of Order, and theſe Methods of doing it may probably be of much greater Service to the young and unexperienced, than ſome in Years are willing to allow; at leaſt they may amuſe, and innocently engage ſome who want proper Subjects to employ them: and probably may ſerve to open their Minds, and give them ſuch a Train of Thinking, which may lay a Foundation for, or promote ſuch a Method of Application to Buſineſs, as may end in a ſolid Judgment; and if purſued with Diſcretion directly, or in its Conſequences, may diſpel the Tediouſneſs of many a melancholy Hour, remove the Anguiſh of many a ſorrowing Heart, procure

the Eaſe of many an unhappy Family; and lay the Foundation of eſtabliſhing or continuing a Steadineſs of Virtue in many an innocent, thoughtleſs, unguarded Heart.

If then Health, Pleaſure, and Profit are the natural Conſequence of Undertakings of this Nature; it may not be improper here to inquire, how they come to be ſo little purſued; and what Lion there is in the Way to obſtruct or terrify us from endeavouring, by ſo eaſy an Application, to procure Health, Eaſe, Plenty, and Peace.

Now to what is before-mentioned, three Things may probably be objected.

That it is beneath the Dignity of a Gentleman, to engage in Affairs of this Nature.

That ſeveral who have buſied themſelves in Buildings, Alterations, and pretended Improvements, have felt fatal Effects from ſuch Undertakings. And

Laſtly, That Gentlemen are generally unacquainted with Affairs of this Nature; and conſequently liable to be frequently impoſed on in the Management, and deceived in the expected Succeſs of ſuch Projects.

To the firſt of theſe it may be anſwered, That we do not propoſe that Gentlemen ſhould condeſcend to the meaner Labours of the Huſbandman; but ſure a prudent ordering of a Gentleman's own Affairs, can never be thought below the Dignity of a wiſe Man; and if the Arguments and Examples of the greateſt Men in moſt Ages, might prevail againſt the weak Modes and Practice of the Moderns; that Method of Life can never be contemned, on which Tully, Virgil, and Horace, have beſtowed ſuch large Encomiums; from which Dictators have been called to the Command of Armies, and to the Pleaſures of which mighty Emperors have retired from the Fatigues of Grandeur. A Life choſe by Scipio, as mentioned by Seneca.

In this Corner that great Man (Scipio) "the "Terror of Carthage, and to whom Rome "owes that it was but once taken, after ma- "nuring his Fields with his own Hands, would "waſh himſelf," for he choſe to work, and tilled his Ground himſelf, according to the Cuſtom of our Anceſtors.

As to the ſecond Thing objected; the ill Conſequences Applications of this Kind may be thought ſometimes to have produced; I believe, if thoſe Inſtances were particularly enquired into, the Ill would commonly be found to ariſe from ill-deſigned, ill-executed, or extravagant Houſes, Out-houſes, Dog Kennels, or monſtrous Gardens; an Inſtance of which I ſaw in Yorkshire, where a Gentleman was drawn in to ſpend near ten Thouſand Pounds, without finiſhing any one wiſe and uſeful Thing; and was ſtill purſuing the ſame Methods, to his Ruin, had he not been ſtopt by the friendly Advice of one, who thereby made both him, and his former Adviſers, his inveterate Enemies: and I preſume, ſimilar Inſtances of Folly may alſo be found in moſt Parts of the Nation; but we cannot thence juſtly conclude againſt prudent Buildings, and uſeful Improvements; eſpecially if proper Care be taken to act cautiouſly in new Experiments, and to have Trials made, and repeated in ſmall Parcels, before large Expences are hazarded in great Undertakings.

As to the laſt Objection, That Gentlemen are often unacquainted with Affairs of this Nature, and for that Reaſon liable to be greatly impoſed on, and conſequently to ſuffer both in their Characters and their Fortunes: the Truth of this is not to be denied, without departing from that Sincerity we profeſs to adhere to; but at the ſame Time we declare it to be the principal Intent of this our preſent Undertaking, to provide a proper Remedy for this Inconvenience, by laying down Rules to guard the Unwary, to guide the Unexperienced, and to be of ſome Uſe and Service to all.

Improvements of Eſtates may be conſider'd in three Views, as they ariſe from what I chuſe to call natural Improvements; ſuch as convenient Buildings, laying Lands commodiouſly together, dividing them into proper Parts, fencing them well, with Things of the like Nature; without any way meddling with the Surface or Soil, by either common or artificial Manures or Management.

Secondly, By what may be called artificial Improvements, as by Lime, Salt, or Burnbaiting, called Denſhiring; and all the different Sorts of Foreign Graſſes, ſuch as Clover, Saintfoin, and many other Things of the like Nature; ſeveral of which have been treated of before particularly, and the reſt will be hereafter.

Laſtly, As they ariſe from the common or late improved Methods of Huſbandry, ſuch as dunging, plowing, and prudent managing of all Sorts of Ground, according to the preſent beſt Methods eſtabliſhed by the moſt obſerving Gentlemen, and the moſt experienced Farmers, in different Counties, and on Lands of different Natures.

Now it is the firſt Article only which we ſhall at preſent conſider, ſince we apprehend the Things which concern that will be the moſt readily underſtood, by Perſons not very converſant in Affairs of this Nature, and will the ſooneſt anſwer Expectation, where there are proper Opportunities of carrying them into Execution. Things of immediate Uſe to us, being of greater Conſequence than the moſt curious Speculations in which we are leſs intereſted. Pythagoras's Rule is excellent. "Search profitable Knowledge. "Whatever Time is ſaved, Inconvenience re- "moved from, or Advantage gained to a Gentle- "man's Servants in his own Family, or to or "for his Tenants or their Servants, out of it, "ſo much additional Wealth he certainly ſaves "or gains yearly in his Expences, or to his "Eſtate, either directly or in the Conſequences "of it."

This Rule is alſo applicable to every Farmer and Labourer, and indeed to every Station of Life, from the Coronet to the Cottager.

But as Examples and Inſtances make deeper Impreſſion than Rules or Precepts, I ſhall here mention a Caſe of my own, in a Particular of this Nature.

When I purchaſed the Eſtate I ſince lived at; I found a Well, with its uſual Conveniences, about ſixty Yards from the Kitchen Door, and when

I had fixed a Pump there, ſtill found the Expence of carrying Water, taking in Brewing, Waſhing, and other Accidentals, full half a Crown a Week: on which I laid the Water into the Houſe from a Ciſtern, placed under the Pump; which was covered and contrived ſo, that it muſt be near full before the Water could flow out at a Spout, near the Top of a Ciſtern, before the Men Servants, or Neighbours, could have any for their Uſe, or receive it in under Ciſterns for Horſes or the Cattle to drink at. By which Means the Houſe was generally ſupplied with Water, without the Servant's going out to pump.

The whole Expence was about eight Pounds, and one Pipe was laid into the Kitchen, one to the Waſh-ſtove in the Brew-houſe, one to the Side of the Copper (for the Level would not carry it into the Copper, but the Water was eaſily laded into it, out of a Tub which ſtood under a Cock cloſe by it) and another Pipe was laid into the Garden, to water that.

I preſume, I need not mention the Eaſe and Saving this one Article procured, beſides the Water's being better and freſher this Way, than the other.

And I believe proportionable Advantages will be found in moſt, if not all, the general Improvements after-mentioned.

Every Farmer will find the Difference of milking near Home, and at a Diſtance; in one Place only, or in different Paſtures.

And every good Oeconomiſt will contrive his Affairs, as far as he can, with Prudence, ſo that what is moſt wanted ſhould be the neareſt, and thoſe at the greater Diſtance which he, or his Family, have leſs Occaſion to reſort to.

The Subſtance of thoſe I call natural Improvements, may be compriſed under the following Heads:

Commodious Buildings;

Laying Farms and Lands conveniently together;

Dividing large Grounds into leſſer of proper Quantities;

Keeping up good Fences and Places for Shelter;

Supplying Grounds with Water to float them, where that can be conveniently done, and makeing proper watering Places where wanted;

Taking Water off, or draining Grounds which are too wet;

Proportioning Corn Land and Graſs Ground properly for the Farm;

Making good Roads;

And laſtly, I ſhall juſt mention the Alteration Time makes in the Value of moſt Lands; which may be of Uſe to ſeveral Gentlemen and others, to have it obſerved to them.

1. Of commodious Buildings;

We ſhall not, under this Head, launch out into the Manner, Method, or Expence of Buildings at large; which depend ſo much on different Situations, Prices of Materials, and Wages of Workmen in different Places; and which, if expedient, would fall more properly to be conſidered when the Farmer's Houſe and Out-houſes, &c. are treated of: but here I ſhall only obſerve, that large Timber is commonly one of the greateſt Expences of Building, and that great Roofs require the greateſt Expence to ſupport them: and in Farming Affairs a narrow and long Building will commonly anſwer the End full as well, or better than a ſhort and wider one, and that at a much leſs Expence; except where they throw their Corn in order to clean it, which requires Space for that Purpoſe, the Expediency of which Method will be hereafter conſidered.

In other Caſes, having Room to thraſh in the Barn, and a Door toward the South Weſt Wind, the Farmer will ſeldom want a Wind to clean his Corn; and when ſuch a Caſe happens, a Hand Fan will eaſily ſupply the Want of it.

As to Standing for Beaſts, thirteen Feet wide will do for four, whereas ſix require twenty Foot wide; and every Perſon of any Experience well knows, that a Roof of above twenty Foot wide, and the Expence of after keeping it in order, will far exceed that of thirteen Feet wide with the Addition of ſeven or eight Feet more in length for a third Row of Beaſts; which Remark may be eaſily and uſefully applied to many other Caſes.

As to the monſtrous great Barns formerly erected at ſuch a vaſt Expence, as are to be met with in ſeveral Places, they are very little valued now; ſeveral judicious Farmers refuſing to uſe them ſo much as they might: apprehending their Corn and Hay to be better and ſweeter, when ſet in Stacks in the open Air, than when houſed. And in many Places the tying up their Beaſts, at any Time of the Year for the whole Night, is generally omitted, and they find them to do as well.

But what is of much greater Concern under this Head, is the Benefit which ariſes to the Owner of a Farm, both as to the Eaſe in the Management of it, and alſo as to the preſerving it in a proper State of Huſbandry. When the Buildings are prudently placed in the Ground, in Compariſon of thoſe placed at a Diſtance, or ſituated in low Places from which the Manure can ſcarce be poſſibly returned to the Land again, and what is ſo conveyed is at a great Expence; and conſequently the upper or diſtant Land muſt be gradually impoveriſhed.

Whereas, when the Buildings are on the Level with the Land, and in the Midſt of it, the Manure cannot be loſt, and the whole Courſe of Huſbandry will be carried on with much more Eaſe, and at a much leſs Expence.

The Advantage of ſuch a Procedure I ſaw made very plain, by removing an old Houſe which ſtood in a Village diſtant from the Land, into a proper Place in the midſt of the Farm; by which Means they always milked at the Door; and one Man, Woman, Horſe, and Sledge, managed the ſame in general with as much Eaſe, as two Men, two Women, a Cart and Horſes did before. And any one may eaſily compute how much was got or ſaved by it in the Year.

There are very few large Quantities of Ground, but ſome proportionable Advantages of the ſame Nature may be procured, with a little Diſcretion, at a very moderate Expence.

Lee Walls (as they are called) are frequently erected much in the Shape of a great L, both on Commons, and in large Paſtures, by common

Tenants, to ſhelter Beaſts and Sheep againſt ſevere Storms, and violent Winds from every Point of the Compaſs. The Benefit of them is very well known; and I have often wondred that ſomething of this Kind is not more frequently to be met with in many Grounds near LONDON, and ſeveral of the Marſhes in KENT and ESSEX, where there are ſo few Out-fences to ſhelter the Cattle from Wind and Weather.

A ſmall uſeful Building which would very well anſwer this End, might be contrived at little Expence; and eaſily conſtructed ſo as to be taken in Pieces, and carried from one Place, and ſet up in another.

In an Affair I had in a bleak Marſh in ESSEX this Summer, with two Men in one Day I made a Shelter on a riſing Ground for the Workmen, and ſo on, by ſinking the Ground above a Foot, and making the Side Walls and back Part of the Turf and Soil, and then covering it with Boards, which anſwered every End propoſed, and will do ſo till the Work is compleat, and the Wood carried away.

When the late Czar of MUSCOVY built PETERSBURG, he contrived the Houſes ſo that one of them might, on Occaſion, be taken down in two Hours, and eaſily ſet up again in another Place.

And when Sir WALTER RAWLEIGH went againſt the SPANIARDS, he carried all the Parts of the Veſſels he was to uſe there, ready to be immediately joined together when they came to the Place appointed.

A Roof alone might be ordered ſo as frequently to be uſeful to ſet over a Quantity of new Hay in Summer, till a large Rick be made, or even to cover the Rick till it was finiſhed in the Nature of a moveable DUTCH Barn; by which Method a good deal of Damage, and a great deal of Trouble, frequently occaſioned by intervening Rains, might be, in a great Meaſure, entirely avoided; and there are few Farmers but ſuffer yearly by Rains one Way or other, before their Hay Ricks and Corn Stacks are ſo well covered as to be effectually ſecured.

Some uſe old Tarpawlins, which may be of ſome Service, and ſo would two or three Fleaks thatched, and hung croſs a Rick, which any Farmer may very eaſily procure, or make for himſelf.

And why might not ſlight moveable Buildings, as above-mentioned, be of equal Uſe to our Horſes and Cattle in Summer, by affording them a ſure Shelter againſt the violent Heats, and other raging Inclemencies then predominant, as they do in Winter againſt Storms, Froſts, and exceſceſſive Colds.

Our Bodies, and thoſe of our Beaſts, are probably, in a great Variety of Inſtances, more like one another than many Perſons are willing to allow.

Are we not ſubject to the ſame Sorts of Diſeaſes, and are we not alike proportionably ſenſible of Heat and Cold, piercing Winds, and violent Storms.

The Hiſtory of JAMAICA aſſures us, that there are Times, when, unleſs the Labourers put on their Cloaths, they will be in great Danger of loſing their Lives; and in ſome Places with us, piercing Blaſts have been almoſt as prejudicial, and ſome Winds certainly ſubject us to particular Diſtempers, which are ſoon perceived, and occaſion others, though we are not directly ſenſible of them at the Time of the receiving the Contagion.

Every Houſewife is ſoon ſenſible of the ill Effects ariſing from the Cows being hurried about in hot Weather, both as to the Goodneſs and Quantity of their Milk. And I know a Farm in CHESHIRE which, on a moderate Computation, is thought to be damaged five Pounds a Year by the Cows being deprived, by a Navigation, from ſtanding in a River in the Heat of the Day; and the Prejudice to the Paſtures, by their gading and running about, is very well known.

Any good Workman would eaſily contrive Buildings of this Nature, and we have ſome Plans of ſome ſuch Sort of Buildings, which we ſhall communicate.

The next Head we have to conſider is,

The laying Farms and Lands conveniently;

We have before mentioned two or three Inſtances of the great Advantages of laying Land commodiouſly together.

Every experienced Farmer will allow, that two Acres together, of the ſame conditioned Land, is of as good Value as five half Acres in diſtant Places in the ſame open Field; the Advantage is proportionably greater when the Portions of Land are leſs; and it is not uncommon to find many Parcels of Land both in open Fields, and good Meadows, containing much leſs; which when laid together and incloſed, are often more than double or treble the Value they were before; eſpecially near great Towns, or in Countries where Graſs Ground is ſcarce. And I believe, within my Memory, there have been fifteen hundred Acres of Field Land incloſed near DERBY, which from eight or nine Shillings an Acre, whilſt in the open Field, is now let from three Pounds to twenty Shillings per Acre, and on an Average at about thirty Shillings.

This leads us to the dividing one Part of large Grounds from another, in proper Quantities.

This, as to the beneficial Part, depends pretty much on the ſame Reaſoning as the laſt Articles; and to the Inſtances before given of the Benefit of it, I ſhall here add another of a formerly remarkable Piece of Land, called HADDON Paſture, near HADDON in DERBYSHIRE, the antient Seat, and Place of Reſidence, of the Duke of RUTLAND's Anceſtors. Mr. LAWRENCE tells us of Mill Stones dug here: but he errs: this Author ſhould not have been ſo ſevere upon others, unleſs himſelf had been more free from Faults. This was a large Piece of Lime-ſtone Ground, and uſually joiſted by taking in Beaſts from all the Country over.

It has been lately divided into ſeveral Parts, by the Perſon who took it, with Lime-ſtone Walls, and ſet out again to under Tenants for two hundred Pounds per Annum more than the original Rent, or than was made of it whilſt it was kept as a fine Paſture.

I could give ſeveral other Inſtances wherein I have been concerned, of the ſame proportionable Profit ariſing ſolely by the parting large Grounds with Lime-ſtone Walls, in Counties where that Material is to be had; which, though not

not ſo ſightly, may perhaps be found the moſt beneficial Fences in the whole Kingdom.

Where Lime-ſtone is to be had in the Ground, any thing near, the Stone will be got, led, and walled ſeven Quarters high, for about four Pence per Yard forward: and you immediately enjoy the Benefit of this Fence. The Foundation is but about two Feet broad, there are no Ditches on either Side, or any Loſs of Ground near them; for the Scythe may cut, or the Plow and the Cattle have Shelter and Meat, cloſe to its Side.

Again, here are no Roots to run into and rob the Corn, no Branches to drop on it, nor any Inconveniences of that Kind, which are uſually objected to the dividing Corn Fields into leſs Pieces than ſixteen or twenty Acres; and theſe Walls certainly nouriſh the Land ſeven or eight Yards near them, and receive the Nitre of the Air; for when an old one is pulled down it ſmells ſtrongly of it. Many are very warm againſt any Plowing nearer the Hedges than ſeven or eight Yards; and a very judicious Farmer told me, that he never expects or finds above half a Crop near the Hedges, in proportion to what he reaps in the Middle of the Field.

This Remark therefore ought to be minded, in thoſe Places where the Culture of Corn is principally deſigned. And I have obſerved that near St. Alban's, and toward Hempstead, the Corn Fields are generally pretty large, twenty Acres or more each.

Where new Hedges are to be raiſed, a good white Thorn is certainly the beſt; and if planted in proper Ground, may be made to ſave itſelf in four or five Years, and one dead Hedge, once repaired, will generally ſerve to guard it till it is ſafe.

I once planted a Hedge of this Kind with ſtrong Sets out of the Woods, of above an Inch Diameter, ſet them eight Inches aſunder, and cut them within eight or nine Inches of the Ground; and ſome of them (which I let grow to try what they would do) ſhot that Year ſix Foot high, and all ſoon made an Hedge for Cloths, when cut and kept in order, four Foot deep, and a Yard over; but theſe Sets were planted in good freſh Soil.

I had pretty much the ſame Succeſs with ſome Thorn Buſhes I removed for the ſame Purpoſe, cutting the Heads in Proportion to the Loſs I apprehended the Roots had ſuffered by being tranſplanted, and they ſoon anſwered what I expected; and I believe the white Thorn, if indulged, would grow large, and be tranſplanted like other Trees. I have let ſome choice ones grow as large as Trees in Fences; and there are ſome ſingle ones on the Derbyshire Moors near Middleton, by Youlgreave, which are as large as middling Aſh Trees. Theſe being about a Mile diſtant, are very good Guides to Travellers; and I preſume were formerly planted there for that Purpoſe, there ſtill lying about them many looſe Stones, which I ſuppoſe were Walls round them.

This Method of raiſing white Thorn is not what is uſually practiſed. But I cannot but think, from the Nature of this Shrub, that the Deſign of a Gentleman of my Acquaintance, was both reaſonable and feaſible.

He ſet in two Acres of Ground many Rows of white Thorns, which one out Fence ſecured. Theſe, when grown up, ſupplied him with a ſucceſſive Stock of Thorns; and when he had Occaſion to take in any new Piece, he took Part of this to about a Yard high, and ſet them as a new Fence, the Thorns fenced the Outſide, and the Ground being Corn, and nothing admitted into it after the Corn, at the End of the ſecond Year it made a very good Fence. I ſaw not the Event of this, but another Gentleman aſſured me, he had practiſed it with great Succeſs.

Such a Trial can be no great Hazard, the young Sets may be bought at about four Pence per Hundred, which, at nine Inches Diſtance, will go a great Way; and if they are to be rais'd from the Berry (which generally come not up till the ſecond Year) there is a Method taken from an Experiment of Sir Isaac Newton's publiſhed by Mr. Bradley, of bringing them to ſprout in the firſt Spring, by placing them in Wheat Bran, kept warm, and ſometimes wetted a little. And this I tried, and found they ſprouted in Spring, but if too much wet be given them, it will be in danger of rotting them.

I have a great Diſlike to black Thorns, on Account of their ſpreading (frequently ſeven or eight Yards) in the Ground, and neither they or Crabs muſt be admitted in a cloſe Hedge, they both ſtaining them very ill; as white Thorns will do juſt after cutting, but if a Shower intervene, or a few Day's Time, theſe do little Prejudice in that Kind. And Thorn is of ſo hardy a Nature, as to thrive where few Trees will, ſo it may be uſed as a good high Hedge, or as a Row of Trees, to ſhelter againſt cold bleak Winds; and I have ſeen ſuch a Hedge grow amongſt Elms, which, cut properly, ſeemed to be one entire cloſe Fence, of forty Foot high.

As to dividing of Graſs Ground into ſmall Parcels, many are of Opinion, that one Cloſe of ten Acres will maintain as many Cattle and as well as four Cloſes of three Acres each; the principal Reaſons they give are, that in leſſer Grounds Cattle quickly walk over them, and being ſullied and ſtained with their Feet, they will not care to feed thereon; whereas, in larger Fields they have Room to range and feed, till the ſtained Places be refreſhed with Rain or with the Dews, that there is a Loſs of Ground by Hedges and Ditches, that 'tis eaſier to get Water in a great Piece than a little one, and that Cattle love a large Walk, and like not Graſs under the Dropping of Trees.

To which it may be anſwered, that the dividing ten Acres into four Parts, allowing two Yards for the Hedge and Ditch, takes up but about one ſixth Part of an Acre; that if there be Water it may be eaſily laid to two or three of the leſſer Cloſes, or that may be eaten firſt which has the Water, and then laid to, that the other Hedges and Trees may be kept down, ſo as not to ſour the Graſs much; or if permitted to grow will be of above an equivalent for that Damage. And when they are eaten by Turns, the firſt will be wonderfully recovered and ſweetened, before the Cattle are brought back to it; and it is not to be imagined what Conveniencies ariſe from

four or five ſuch ſmall Cloſes; at the beſt managed Farm I know, they have ſix of them, they can go into or from the fold Yard, in which they can keep their Swine on Clover, and let them out each Night to their Supper; keep a Cow or two on good Graſs, for good Milk and Butter, a Horſe or two, to be ready on every Occaſion, and eat the others as proper, whether they be Turnips, Clover, or Graſs; or lead through them to farther diſtant larger Cloſes, or keep a Piece of choice Graſs, Clover, or Turnips, to top up fat Beaſts with, or ſupport them with at the Time other Paſtures generally fail.

There has been ſo much ſaid of Good Fences, and Places of Shelter, under the former Heads, that I ſhall only mention they are a Security of our Property to us, and the great Preſervers of Peace and Quiet in a Neighbourhood. They preſerve both our Grounds and our Cattle warm and well, and have ſuch viſible Good ariſing from them, that it becomes a Sort of a proverbial Saying, amongſt the Farmers in one of our Counties celebrated for good Huſbandry, That "A warm, cloſe, high Hedge, is half the Cattle's Meat in Winter, in cauſing that which is "given them to do them the more good," which is certainly as juſtly applicable to Shelters in Ground, as to Fences round Ground.

The next Article we come to is, the ſupplying Grounds with Water to float them, where that can be conveniently done, and making proper watering Places where wanted and ſuitable.

Where Lands are ſituated near Rivers or Brooks, or under riſing Grounds above them; the Benefit of floating of Meadows in dry Seaſons (and indeed at other Times) is frequently eaſily and very advantageouſly obtained; for Water is of that ductile Nature, that it may be eaſily guided from Place to Place, and near ſeveral great Towns there are many Meadows which muſt be mowed and cleared by Midſummer, lying common after, which owe their returning Fertility to the Waſh of the Floods overflowing them after the Hay is got in; for which Purpoſe thoſe Banks which were raiſed to ſecure the Graſs, whilſt growing, from Floods, are immediately after opened in ſeveral Places, to enrich the ſame Meadows by all the ſucceeding Floods, till the following Spring, when the Banks are again made up.

This is ſo fine a Way of improving, that whereever Water comes from off rich Lands, or is impregnated with the Waſh of any Town, ſuch a Floating is much to be deſired; and it is a very good Practice to mix Manure with common Water, ſtirring it as it paſſes, as the Water will, this Way, convey it in the moſt beneficial Manner to the Graſs Roots. But where none of theſe are to be had ſometimes in great Droughts, the conveying common Water over the Meadows, will be very beneficial.

But what is more immediately under our preſent Conſideration is, how to provide for that Want of Water, which is commonly the Caſe in Lime-ſtone, Chalk, Sand, and Gravelly Ground, which though they receive their equal Share of Rain and Dew from above, yet being porous and open, the Wet that falls ſoon ſinks into the Ground, and ſo is loſt.

In ſome Grounds of this Nature there are Meers of Water, which ſupply the Cattle with what is neceſſary for them to drink; and where ſuch are not to be met with, there are very few Quantities of Land where, in a low Place, the Rains may not be brought from the higher Ground, and a Baſon, or watering Place, readily made, by laying a proper Mixture of Clay, tempered like Mortar, or by a Bed of Lime-aſſe well beat together; and I am aſſured, worked Chalk will anſwer the ſame End, laid at the Bottom and Sides of a Pit or Pool dug for that Purpoſe, which, if well made, will laſt long and anſwer the Purpoſe, eſpecially at the End of Summer, and in Winter. But Care muſt be taken to cover the Bottom with ſome Sort of Pavement, to prevent the Cattle poaching Holes in it with their Feet; and the Reader need not be told there muſt be ſome Walls to keep the tempered Mortar ſafe on the Sides, as high as it is propoſed the Pool ſhould ſtand with it, and little Cuts, if neceſſary, to bring the Water from above, to the Place prepared for it.

The firſt of this Kind that ever I ſaw, was in a Gentleman's Lime-ſtone Park in Somerſetſhire, which the Owner told me coſt him at firſt thirty Pounds, and ſoon failed, but the Breach being found and repaired, it had then ſtood firm many Years, and was a very large one; but ſmall ones are now made, where the Materials are near, for forty or fifty Shillings, and often ſo contrived as to fit two or three diſtinct Parcels of Land, by parting them in the Middle, or by looſe moveable Rails, to lay them to one Side or the other.

The ſame Gentleman had walled his Park high enough to keep in his Deer, with Lime-ſtone Walls, but they being higher than dry Lime-ſtone, will commonly ſtand long. He poured in two Beds of Mortar whilſt it was building, one at about two Foot high, the other about four, and the Wall then ſtood very firm.

Exceſs of Wet is often as prejudicial as the Want of it, which brings me to the Manner of taking Water off, or draining of Grounds which are too wet.

The principal Point, in this Caſe, is to find the loweſt Place by which the Water can be carried off, and there open a wide Trench, of Depth ſufficient to drain the whole, which may properly be kept open; into this ſide Croſs Drains may be laid and covered.

The beſt Method for theſe Croſs Drains is ſaid to be that uſed in Eſſex, by making a Trench near two Foot deep, not above two or three Inches wide at Bottom, then filling it with Thorns, or any rubbiſh Wood, and covering it by turning the Turf downward, and then you may plow. The Difficulty is to lay the Drains in the loweſt Places, in which the Eſſex Men are thought particularly ſkilled.

I have known, where Stones were in Plenty, little Suffs made at Bottom, and ſmall Stones poured on it a Foot deep, ſo covered up, which anſwered very well; and I have alſo known wet Grounds much mended by very ſmall Gutters, of four or five Inches wide, leading to proper Deſcents, and what came from them ſpread on the Ground, to prevent its being trod in again.

Theſe are eaſily made, and eaſily kept open, and if deeper than the Roots of the Graſs, will, on clayey Ground, carry off the Wet very well.

The proportioning of Corn Land and Graſs Ground proper for the Farm, is an Article ſcarce poſſible to bring under any general Rules, eſpecially ſince the new Huſbandry has prevailed, by which the Farmer may keep more in Tillage, or Graſs Ground of natural or artificial Graſſes, as he pleaſes; and needs not want of either to employ ſuch a Team as he thinks proper to keep, ſuch Cows as he thinks proper to milk, ſuch Cattle as he propoſes to rear or feed; in moſt of which a judicious Farmer, if he has Ground enough, may make it anſwer any End he propoſes, with proper Application of it.

One general Rule indeed there is, which he ought ſtrictly to adhere to; which is, never to have more Ground in Tillage, or appropriated for Hay, than he can huſband and dreſs well.

He had better have two good Acres of Corn than ſix of bad, or four of middling; and the Expence attending the worſt, is as great as that of the beſt.

The ſame in Proportion may be ſaid of Hay Ground; and in both Caſes, if the worſe Sort be paſtured, or lie Fallow, it will be of ſome Benefit, and preparing itſelf for a future good Crop.

Of making good Roads.

The making Roads good meets with ſo general an Approbation, through the whole Kingdom, that there ſeems not to need any thing be ſaid to encourage and influence Gentlemen, and others, to do it about their own Houſes, and alſo to promote it in their own reſpective Neighbourhoods.

This might be generally compaſſed by the uſual Labour of the Villagers, and a little Money expended under the Direction of a Perſon ſkilled in Affairs of this Nature; by which Method I have known Hills, before hardly paſſable by a ſingle Horſe, made almoſt as eaſy for a Coach as St. James's Street is; and the Side of a Precipice made a ſafe common Road, without Danger or Terror to the Traveller, by a Wall being erected next the Precipice, which takes off the Terror, and is a reaſonable Security to the Paſſenger.

The Eaſe of Mind, the Safety to Man, Horſes, and Carriages, the cheap conveying of all Sorts of Portables from Place to Place on good Roads, and the Time ſaved by it, will ſoon be an Equivalent for the Expence, and perhaps extend its Uſefulneſs to unexpected Diſtances; ſo that it may be a Bleſſing to a Country, and even to future Generations.

The greateſt Improvement of this Kind which I ever knew, was betwixt Wych and Worceſter; for when I firſt travelled that Road they were beginning to mend it, I ſaw eight or nine Horſes hard ſet to draw a Tun of Salt; but travelling there again ſome few Years after, I ſaw no Waggon had above four Horſes, and ſome but three, to draw the ſame Quantity.

The Romans, whoſe Wiſdom we are ſo ready to commend in ſome Inſtances, where they leſs deſerved it, in this Particular certainly demand our Applauſe and Imitation; for they cauſed good Roads to be made from Place to Place, wherever their Legions came, and ſome of their Works of this Nature are ſtill viſible and uſeful amongſt us, after all the Length of Time ſince paſſed.

To do Juſtice to Cheshire and Lancashire, they have, I believe, laid out more Money in making good Roads, and to better Purpoſe, though Materials are very dear in many Places there, than any ſix Counties in England, excluſive of Turnpikes; and moſt Farmers there have a Horſe Pavement from their Doors to the great Roads; and ſome Gentlemen have expended an hundred Pounds, in paving from the Road to their own Doors, which in ſome Places would, if wiſely managed, repair the Roads for ſome Miles.

It is ſcarce to be thought how far a good Paviour will carry on a Horſe Cauſey in a Day, I ſpeak within Compaſs when I name ſixty Yards. And I had a Servant of my own, who with a Labourer to aſſiſt him, and Teams to lead to him, in a Lime-ſtone Country, made a new Road above eight Foot wide, and ninety long, in a Day, ſetting both Outſides with the largeſt Stones for near two Feet on each Side, where the Wheels run, and filling and raiſing up all the Middle with what we call Lime-ſtone Gravel (being ſmall Lime-ſtone) which if not trod on, in a few Days, will bind like a Rock, and on which the Horſes will tread freely, which they never do where the Roads are ſet with great Stones.

The late ingenious Mr. Cooper, of Leiceſter, who gained ſo much Reputation by mending their Roads ſo well, brought all his Work to the following Certainties.

Twenty up-heaped Strikes (or Buſhels) were a Load, which, when firſt meaſured and levelled as uſual, Laths were nailed on the Carts for aſcertaining it for the future.

Each Farmer filled his own Cart, and had generally one Penny half Farthing each hundred Yards it was carried.

The Gravel was got and ſpread at one Penny per Load, and a Perſon appointed to ſee all fairly done.

He farther obſerves, That Water Gravel never makes ſo fine a Road as what is dug out of the Earth, but where that is eaſier to be had, being mixed with a ſandy Soil to bind it, it will make a good Road.

In ſome Places we meet with a ſoftiſh Sort of Gravel, having too large a Mixture of Clay, Marle, or Sand amongſt it, which, though laid thicker on the Road than ordinary, will not ſtand one Year's Wear; and yet we have found that ſome Gravel, after ſcreening it, as it is done for Gardens, and leaving what falls through behind, to make as good and durable Roads as any we have.

Theſe Particulars I have taken from a Manuſcript of that Gentleman's never publiſhed.

The laſt Article I have to mention here is;

The Alteration Time makes in the Value of moſt Lands.

This Difference cannot be ſaid to be an Improvement, but an Alteration of the Value of Lands, ariſing chiefly from the additional Quan-

tity

tity of Gold and Silver conſtantly brought into theſe Parts of the World; ſo that, properly ſpeaking, Gold and Silver may be ſaid to be of leſs Value now than they were formerly, as an Ounce of either will not now purchaſe one half of the Quantity of the neceſſary Proviſions for Life (excluſive of the Taxes laid on ſeveral of them) which they formerly did, and which it may be proper the Reader ſhould be informed of.

The Rents reſerved in Money, in College and other Leaſes, and the Rents paid in Corn, which in Queen Elizabeth's Time were of equal Value, now are ſo different, that they are a full Proof of the Variation; for the half now paid in Corn, Malt, and ſo on, is at preſent above three Times as much in Value, as the other Moiety ſtill paid in Money, as I have obſerved in the ſeveral Leaſes of that Kind which I have been concerned in.

A late Writer ſeems to think this to have been the ſingle Caſe of one College, not knowing, I preſume, that it was fixed ſo in general, by the great Cecil, in order to preſerve a Subſiſtence for Biſhops, Deans, Colleges, and ſo on; and if it had not been ſo ordered, moſt of thoſe Bodies could not now have poſſibly ſubſiſted on the Incomes of their Eſtates.

Hence we may infer, that Lands then let at twenty Shillings per Annum, ſhould now, according to the Courſe of Things, be of the Value of near three Pounds, unleſs ſome extraordinary Circumſtance varies any particular Caſe from the general Rule; as where the great Improvements made by Lime, and artificial Graſſes on high Lands have ſunk the yearly Value of thoſe low Meadow Grounds, which, being enriched by the Over-flowing of the Rivers from the Lime-ſtone Mountains, paſtured with Sheep, uſed to be the only Places where Spring Graſs, and early fat Meat were to be had: it being alſo within Memory, how better Families were obliged to lay in great Quantities of Hung Beef for the Winter, very little of that Sort of Meat being then killed in that Seaſon, even in the great Towns; whereas, ſince the above-mentioned Improvements by Lime, &c. Hung Beef is ſcarce ever heard of, and fat Beef is now to be had in almoſt every Village, in every Month in the Year.

There are ſeveral other Particulars which might be conſidered under the Title of general Improvements, but as they may alſo be treated of under ſome particular Heads, we ſhall leave them to be conſidered as they may fall in properly hereafter.

In the preceding Part of this Work the Reader has been led through all the various Soils uſually to be met with in theſe Kingdoms, and the different Methods commonly taken to improve them by Dungs of all Sorts, as well as by the artificial Manures of Lime, Salt, and the reſt: all which have been copiouſly treated of, and (after ſome other intervening Articles) the Method and Manner of Plowing, Sowing, Harrowing, and Rolling, have been ſufficiently enlarged on; the ſeveral Grains, Graſſes, and Roots themſelves come now to be particularly conſidered.

But before we enter into the diſtinct Conſideration of the ſeveral Sorts of Grains, Graſſes, and Roots, uſually ſowed and propagated in this Kingdom; we apprehend it will be proper to take a ſhort View both of the Antient and Modern Tillage, which have prevailed amongſt us; which, when ſtated in a plain and intelligible Manner, the Reader will be thereby the better inſtructed, how to form a proper Judgment of their ſeveral Advantages and Diſadvantages, and know how to guide his own Practice, and to fix to himſelf a ſure Rule for his Conduct.

Of the old Huſbandry.

The uſual Method of Tillage in the Corn Counties in England formerly was, and ſtill is, in thoſe Places where what is called the New Huſbandry has not yet prevailed, conducted in the following Manner.

Each ſeveral Village in the Corn Counties generally had three diſtinct common Fields (or Sides, as frequently called) belonging to it, uſually of pretty near equal Quantities; which three Fields were appropriated to three ſeveral yearly Courſes of Tillage.

One of theſe three, each Year, is appropriated chiefly to Wheat, though ſometimes it had Barley in it, and this has always born the Name of the Wheat Field.

The ſecond is called the Peaſe Field, being ſowed, for the moſt Part, with that Pulſe, though Beans and Oats, as found convenient, are commonly ſowed therein alſo.

The third Field, or Side, is called the Fallow Field, as not being ſowed at all; but repeatedly plowed, harrowed, and manured, as the Owner judges beſt for his Land, in order to prepare it for the following Crop of Wheat or Barley, in the ſucceeding Year.

Theſe three ſeveral Names are regularly ſucceſſively applied to the ſaid ſeveral Fields, according to the Courſe they come in, of being ſowed with Wheat or Peaſe, &c. or lying Fallow.

Theſe were the repeated ſucceſſive Rounds of the English Tillage, in former Ages; and they were found ſufficient to produce good Corn, and that in great Quantities; and the ſame Method is ſtill continued in thoſe Parts of the Kingdom, where what is called the New Huſbandry, has not yet prevailed.

The manuring, and two Year's due plowing, the two fallow Years (with proper plowing and ſowing the other four Years) were found ſufficient to produce four ſucceſſive reaſonable good Crops in the ſix Years; and thoſe four ſuch Crops again produced a ſufficient Quantity of Manure, for the dunging the Ground during the ſaid Circle of ſix Years.

But when Lime was found to be very beneficial for the producing of good Corn, and has been applied accordingly for that Purpoſe; where that could conveniently be had, it hath made the well manuring the common Corn Fields much better and eaſier, and rendered the leſs Dung neceſſary for the ſaid four Crops in the ſix Years.

And though Corn was alſo formerly ſometime ſowed in incloſed Grounds, and much more ſo ſince the late Improvements made by Clover and Turnips; yet the open Fields always had, and ſtill have the Preference, as producing the beſt and ſweeteſt Corn, and as the leaſt ſubject

to Smuts and Blights; and it is alſo found, by common Experience, that Corn growing near an Hedge has not uſually ſo great a Quantity as that which grows in the Middle of the Cloſe; the Reaſon for, or Cauſe of which will be mentioned hereafter. The open Fields have alſo more of the Sun and Air, are leſs annoyed by Birds, and have leſs Fences to be taken Care of, thoſe being uſually made by the Lands adjoining to them.

There are ſome Inconveniencies the open Fields were always ſubject to, by their being generally divided into ſmall Parts, and thoſe the Property of different Perſons; for by Reaſon of this the Farmer is obliged to plow always the ſame Way, and never can plow the croſs Way, which is often found very uſeful for the Ground; and there are ſome other Inconveniences which the Owners of Field Lands are ſubject to, in order to preſerve the general Peace and Quiet of the Neighbourhood, ſuch as obſerving pretty much the ſame Times and Seaſons of plowing, ſowing, reaping, and fencing.

The dividing the common Corn Fields into ſo many very ſmall diſtinct Parcels, as they formerly were, and in ſeveral Places ſtill continue to be, to a ſurpriſing Degree, is worthy a diſtinct Conſideration. A Farm of mine, under thirty Pounds per Annum, containing one hundred and fifty-three Pieces, forty of which were not each a Rood, and two Acres no where lying together, and the whole Townſhip being alſo much in the ſame Manner, very few of the larger Eſtates having two Acres together in many Places.

This Method of dividing the Fields into ſo many ſmall Parcels, is generally thought to be owing to a political Deſign of our Anceſtors, to promote the Culture of Corn, by preventing the Fields being incloſed, as they were made the diſtinct Property of ſo many different Perſons.

But I preſume this Method of dividing the Ground was rather owing to the parting it amongſt the Followers and Soldiers of thoſe who ſucceeded in conquering, as a Recompence for their Services, according to ſome of the antient Military Ways of proceeding.

This ſeems moſt agreeable to the old Method of the SAXONS, as evidently appears by the cuſtomary Mineral Laws in DERBYSHIRE; by which, though the whole Mineral Field is at liberty for any Perſon to work in, yet if any one finds a Mine there, by that cuſtomary Law, he can take but ſo many Yards as the firſt Proprietor; and every other Subject, and he himſelf may take other Quantities of two and twenty Yards, one after another, till the whole be poſſeſſed or taken; but then, every diſtinct ſaid Number of Yards ſo taken, is a diſtinct Title and Poſſeſſion, and may be ſeparately owned by many different Perſons in Partnerſhip. This and many other Cuſtoms, prove that the Law uſed there is the beſt Remain we now have of the SAXON Method of proceeding, which was ſhort and clear, as the learned Doctor HICKES, and others, well ſkilled in our Antiquities, generally have ſhewn.

The Method before mentioned was, in general, the Courſe of the ENGLISH Tillage, till the Introduction of the foreign artificial Graſſes, gradually within about eighty Years laſt paſt; and the Advantages by the ſowing thoſe Graſſes and Turnips, in the Incloſures, and alſo now in many of the open Fields, and particularly by that of Clover.

For by Clover and Turnips many of thoſe Lands which formerly were of very little Value bearing little Graſs, and no Corn, have been rendered very profitable as Graſs Ground; and alſo brought to produce very good Corn of moſt Sorts; and thoſe Lands both in the open Fields, and in the Incloſures which formerly were thought to anſwer well to the Plow in the Courſe of Tillage, have been greatly improved even in that Reſpect, by the ſowing of Clover and Turnips; and that third Year, which was before conſtantly in a great Meaſure, loſt by lying Fallow, is now generally made to produce a Crop of Clover or Turnips commonly worth, if tolerably well managed, at leaſt twenty or thirty Shillings an Acre, often more; which Clover and Turnips are ſo far from occaſioning any additional Expence, that they are found much the cheapeſt and beſt Methods of preparing the Land for Corn.

Theſe two, with the other artificial Graſſes, have given a quite different Turn to the general Courſe of our Huſbandry; and where the ſowing of Clover and other artificial Graſſes, and of Turnips and other Roots have prevailed, the Method of managing with and by them, has obtained the Name of the new Huſbandry; to which we may not improperly add the Method of Drill Huſbandry, which, though not ſo modern as ſome pretend, being introduced here by the late Earl of SANDWICH, as appears by the Philoſophical Tranſactions *, the Inventor of it being Don JOSEPH de LUCATELLO, Knight, who had the ſame publickly tried in GERMANY and SPAIN, and had a Patent granted him by the King of SPAIN, about the Year one thouſand ſix hundred and ſixty-five, as the Inventor of the Drill Plow, called then the Sembrador, contrived to Plow, Sow, and Harrow at once.

* *Philoſ. Tranſ. 2d Vol. 741-744.*

But the ſame Method of Huſbandry being practiſed by the late Mr. TULL, who wrote a Book on this Subject, that Method has prevailed in ſeveral Places, and conſequently may be properly conſidered under the Head, and as a principal Part of the new Huſbandry; to which we ſhall now proceed.

Of the new Huſbandry.

The Advantages of this new Method of Huſbandry, when ſet in a proper Light, and compared with the former cuſtomary Tillage, are really ſo many and ſo great, as juſtly to entitle it to the Preference; and conſequently it very well deſerves the attentive Conſideration of every Perſon any way particularly intereſted in Affairs of this Nature, and who is not directly, or in Conſequence intereſted in Huſbandry on which our Suſtenance depends?

In our Entrance on the Conſideration of which, as we before ſtated the Courſe of the former Method of Huſbandry, in a clear Manner, to the Reader's View; ſo we will endeavour to do the ſame by this, as ſhort, clear, and fully as we can; but this modern Method, admitting many more Variations, both as to the different Sorts,

and

and the greater Number of Seeds to be ſowed, and alſo more yearly Changes of the Corn, than than the other does admit of; conſequently the Courſe of this new Huſbandry cannot be compriſed in ſo few, eaſy, and familiar Rules as the other was.

Indeed, in this there cannot be many certain Rules of ſucceſſively ſowing of Grain laid down, to be conſtantly followed, for a regular Succeſſion of Years; for in this new Huſbandry there being many more Grains, Seeds, and Roots to have their Turns in the Courſe of Tillage, they conſequently give the Farmer a much greater Latitude of varying and altering his Crops, ſo that he is not under that Neceſſity of repeating the ſame Species of Corn in the ſame ſhort Number of Years he formerly was.

By this new Method of Management it is propoſed, that the Farmer ſhall generally have ſix ſucceſſive profitable Crops, for ſix Years together, from the ſame Parcel of Ground, without the Loſs of any one Year, by letting it lye Fallow: at leaſt he may reaſonably expect eleven good Crops in twelve Years; and all theſe eleven or twelve Crops ſucceſſively, Year after Year, to be of as valuable Sorts of Grain, and as good in their reſpective ſeveral Kinds, and got too with as little Trouble, and at as little an Expence as the four Crops obtained in ſix Years, or as the eight in twelve Years uſually are in the open Fields.

In order to manifeſt the Truth of this, it will be neceſſary to ſtate the Courſe of this new Huſbandry in two or three different Methods, to make it the more plain.

Now by one Method Wheat may be ordered to have its Turn, or to be the Crop once in four Years. Thus,

Firſt, Wheat.

Second, Beans, Peaſe, or Oats.

Third, Clover.

Then Wheat again.

Or Beans, Peaſe, or Oats, may be varied, and the Clover omitted, as the Farmer pleaſes.

By another, and in Appearance a preferable Method, the Wheat, Barley, or other Grain will ſucceed one another but once in ſix or ſeven Years; and may be ordered after the following Manner,

Wheat the firſt Year.

The Second, Beans, Peaſe, or Oats.

Third, any other of the laſt three.

Fourth, Turnips.

Fifth, Barley.

Sixth, Clover, and then a Return to Wheat, or any other of the Crops, for which the Ground will be well prepared again; or if it be liked better, the Clover may be continued two Years together, and will anſwer very well.

Reckoning the Clover as proper to be ſowed two Years in the ſix, by this Method here is a Proviſion for eight Years Crops, out of which the Farmer may chuſe any ſix of them he thinks the moſt ſuitable to his Soil and Circumſtances.

By ſuch a Method as this he reaps three of the richeſt Crops, and one of Beans or Peaſe, one of Turnips, and one or two of Clover, in ſix Years ſucceeding each other; whereas there can be but four obtained in the ſame Time, by the common Courſe of Tillage, and conſequently the new Method of Huſbandry has the Advantage of two more Crops in ſix Years, than the old Method of Culture; which, on Preſumption that the Crops are equally good in the Kind, is greatly to the Advantage of the modern Huſbandry.

All theſe ſeveral Grains and Seeds may ſtill be farther varied, many other Ways, as will hereafter appear, the better to prevent the too quick a Return of ſowing the ſame Grain again on the ſame Ground, which when done is generally attended with a very poor Crop, not only in every Grain ſowed in the Field, but alſo in every Herb and Root ſowed or propagated in the Garden, as is conſtantly experienced. Therefore every judicious Farmer, and every prudent Gardener, will carefully and conſtantly avoid ſuch a Practice, and will frequently change their Grain, their Herbs, and their Roots, from one Spot of Ground to another; till Time, or ſome Courſe of Huſbandry, hath prepared the Ground again ſufficiently for the producing another good Crop of the ſame former Grain, Herb, or Root. Nothing but Horſehoeing can ſet aſide this Neceſſity.

The Change of the Ground otherwiſe, as well as of the Seed to be ſowed, is of that Importance in the Courſe of Huſbandry, that we cannot preſs the Farmer too earneſtly to attend carefully to it in the general Courſe of his Tillage; though I know a very good Huſbandman has had a good Crop of Wheat, next one of Beans, then one of Peaſe, and then ventured to have Wheat again, and ſucceeded very well in it; but then his Ground was in very good Heart, and he knew Beans and Peaſe were generally good Grain to go before Wheat, and he himſelf thought it was full ſoon enough to ſow Wheat again with a reaſonable Expectation of very good Succeſs, without too much impoveriſhing the Land for a future Crop of Wheat.

A very little Conſideration will guide the Farmer in varying the ſeveral above-named Grains, Graſſes, and Roots, ſo as (with God's Bleſſing, and tolerable Huſbandry) to be reaſonably aſſured of obtaining good ſucceſſive Crops; or the continuing Clover two Years together will anſwer very well, as to the profitable Part: and on Courſe it will lengthen the Time one Year before the Return of another Crop of Wheat, and alſo of every other Sort of Grain, Graſs, or Root, by which Means the Ground will be the better repleniſhed with Nouriſhment for the firſt Crop again.

To the great Variety of different ſucceeding Crops, which may be contrived only from the ſeveral Species of Grain and Graſſes above-mentioned, the Farmer may eaſily add many other new Changes, by the ſowing of Rye, French Wheat, Lentils, Coleſeed, and ſo on; as may beſt ſuit his Land and Circumſtances, with which he may make ſuch various Changes, as to carry on a Courſe of profitable Tillage of the ſame Ground, to a much greater Length of Time than can be eaſily imagined, eſpecially after it has ſhared the Benefit of being marled, limed, or chalked. Four Bells will change or vary their Places ſo as never to come again in the ſame Order, four and

twenty Times; and five one hundred and twenty Times, and here are many more than five Sorts of Grains, Graſſes, and Roots, which may be brought into the Succeſſion of returning Crops, after the Manner mentioned of Beſs, though not to ſo great a Degree.

But wiſe Farmers will not carry this to thoſe great Lengths; it might poſſibly be done with Profit if they could keep the Land clean, but will rather chuſe to lay down Part of the Ground they have in Tillage, with profitable laſting artificial Graſſes, or good natural ones; and break up ſome freſh Ground for Corn (for it cannot be imagined that any Farmer has all his Ground in Tillage at one Time) and by theſe Methods he may vary his Crops as he pleaſes, and give his ſeveral Grounds what Years of Reſt he thinks proper, before he brings them on again to a new Succeſſion of Grains, in a new Round of Tillage.

The Paſſion for the Plow is certainly very great in general, and for Wheat in particular, as it is the beſt, and commonly the moſt profitable Grain, but I believe, before this Syſtem be compleated, the Reader will be convinced that other Crops will often be found more beneficial, than to bring Wheat on again in two quick a Succeſſion, without allowing the Ground Time to gain proper Nouriſhment for it, tilling it properly, or manuring it with ſuch Dreſſings as to enable it to bring a good Crop again ſoon; without one or other of which Wheat is frequently found to bring in little Profit, and in ſome Caſes not to pay the neceſſary Expences and Rent.

To convince the Reader of the Truth of what we have ſaid, as to the Profit of the ſoon Return of, or reſpiting the Wheat Crop only for one Year, I will calculate the reſpective Profit which may be reaſonably expected from Wheat Crops in twenty Years, when each fourth Year, and when ſowed each fifth Year during that Period of Time, in which the longer the intervening Time is between, the better the Crop will pay.

Now in this Caſe, in the firſt Method there will be five returning Crops of Wheat in the twenty Years, and three Years between each Crop to manure or improve it; and it cannot be reaſonably ſuppoſed to produce above twenty Quarters of Wheat, that is, four Quarters each Wheat Year.

In the other Method there will be but four Crops of Wheat in the twenty Years, which, with the ſame Method of Huſbandry, and one fourth more of Time muſt, by the Rule of Proportion, be the better prepared by one fourth Part for the producing of ſo much a better Crop; which then muſt be five Quarters each four Wheat Years, which will amount to juſt the ſame Quantity of twenty Quarters in the ſaid twenty Years.

This Method of reckoning is not only agreeable to Reaſon, but on ſtating it in this Manner to ſome very judicious Farmers, they have judged it to be according to what they experience in their Courſe of Huſbandry; and that the Crops in general commonly are better or worſe, according to the Time allowed betwixt the freſh ſowing again of the ſame Sort of Grain.

I am not aware that I am guilty of any Miſtake in this Calculation, unleſs I may be thought to eſtimate both Crops too high, and if any Abatement of that Kind be neceſſary to the one, it is equally ſo to the other, and the Account will come to the ſame at the laſt, or rather, turn more to the Advantage of the four Crops; for five times three and an half would be ſeventeen and an half, and four times four and an half would be eighteen Quarters, and much the ſame will be produced if different yearly Produces are taken.

Now ſuppoſing the Profits equal in the Caſe of the four Years of Wheat in the twenty, there will be the Seed and Huſbandry of one Year entirely ſaved; and as it is probable that Clover might be continued the Year Wheat was omitted, or a Crop of Turnips got; ſuch a Crop, and ſuch a ſaving may moderately be eſtimated at two Pounds ten Shillings gained or ſaved in this Caſe, which may be equally applied to many other Caſes of the ſame Nature, which will eaſe him of ſuch Calculations which many are unacquainted with.

From what has been ſaid the Reader cannot but obſerve, that the Subſtance of all the modern Improvements, eſpecially as far as they relate to Corn and Cattle, are principally owing to Clover and Turnips, each of them producing great Quantities of Suſtenance for our Cattle, and at the ſame Time preparing the Land ſo well for Corn, that where they are properly uſed there is very little Occaſion for the Loſs of letting the Land lye Fallow in general, but only on ſome very extraordinary Occaſions.

Thoſe two therefore muſt conſequently deſerve to be treated of, in a full and copious Manner.

And ſince Wheat is the principal Grain to be wiſhed for, and generally the moſt profitable when obtained, and Clover and Turnips, either directly or in their Conſequences, the beſt Preparatives for it; we ſhall conſider Wheat, Clover, and Turnips as the three chief and moſt excellent of Grains, Graſſes, and Roots, and endeavour to do Juſtice reſpectively to their many uſeful Qualities. In this Method we ſhall not only take in the principal Part of all what concerns the old Manner of Tillage, but alſo all the material Alterations and Improvements made by what is called the new Huſbandry, adding thereto ſome brief Obſervations on the Method of ſowing leſs Corn, and at a greater Diſtance than commonly practiſed; and I ſhall alſo take ſome little Notice of ſeveral Compoſitions and Manures, which have been lately found beneficial both to Corn, Roots, and Graſs Ground; and ſhall occaſionally touch on the Method of drilling the Ground.

We ſhall here obſerve ſome of thoſe Conſequences which the Prevalency of the new Huſbandry muſt neceſſarily produce, when it is conſidered on the diſadvantageous Side; where it may be thought to occaſion ſome Inconveniences or Hardſhips to others, leaving it to every Reader's own Thoughts, to judge of the good or bad Conſequences of it to the Community in general.

The new Huſbandry prevails principally in the South Parts of the Kingdom, and travels but very ſlowly Northwards, and conſequently muſt, at

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preſent, very much affect the North Country Farmers, and their Landlords in Courſe ſoon after; for if, by this new Method of Huſbandry, the South Country Farmer can really produce, by the ſame Ground and Huſbandry, but one fourth more profitable Grain, Graſs, and Root, in the Circle of ſix Years, than the North Country Farmer does, the South Countryman will be able to underſell the Northern, and conſequently the Northern Men muſt ſink, or their Farms fall in their Value, which muſt at laſt fall on the ſeveral Landlords.

The ſame Remark may be alſo made in Relation to the Vale Grounds, and the Uplands; for ſince ſuch great Quantities of good Hay have been obtained in the Uplands, by the Aſſiſtance of the foreign artificial Graſſes, this muſt in Courſe ſink the Value of the formerly ſo highly valued Hay got in the Vales.

The ſame Obſervation may be made relating to the rich Dove-Bank Lands, and ſome others in the Kingdom of the ſame Nature, which were formerly ſo famous and ſo valuable for their feeding of Cattle ſo early and ſo well, that they bore an exceſſive Price; but ſince the many very great Improvements made with and by Lime, by which many other Places are brought to feed all Sorts of Cattle very well, thoſe high-prized Dove Lands have ſeveral of them ſunk very conſiderably in their yearly Value.

But if the Northern Farmers ſhould go into the ſeveral new Improvements, as both their Lands, and their Labourers and Expence of living, are much cheaper than thoſe in the South; by ſuch a Method of Management they might be on an Equality with, or have the Advantage of the South Country Farmers. For as for their being nearer or farther from the beſt Markets, thoſe Circumſtances were always the ſame, and ſeem in general unalterable, though ſome Variations may probably be hereafter made therein, by making more Rivers navigable, or future better Contrivances of Carriages, or mending of Roads, by ſome of which I have known four Parts in five of Carriage ſaved.

Though the ſeveral Species of Corn, Graſſes, and Roots, will be ſeparately conſidered under their reſpective Titles; yet we thought the ſtating them together in the ſeveral Views above-mentioned, would guide the Reader the better and eaſier how to vary his ſeveral Crops to his greateſt Advantage, than if he was left to make ſuch Collections himſelf, which would coſt him more Pains and Thought than he will be apt to imagine; notwithſtanding which there is ſtill Room for any ſenſible judicious Reader, to make many other uſeful Variations of his Crops, than he will at firſt imagine, or than can be eaſily deſcribed.

We come now to conſider the ſeveral Sorts of Grain, Graſſes, and Roots ſeparately, and ſhall begin with the principal and moſt valuable Grain, which is Wheat.

Wheat is of ſo excellent a Nature, and of ſo general a Uſe, that it cannot be too much commended, nor ſufficiently taken Care of as to the Culture and Management of it; for which Reaſon we ſhall treat of it firſt in general, as it really is what it is frequently called, The King of Grains; and we ſhall after conſider the ſeveral Sorts of it in particular, and the Culture, Management, and Produce of it; by which the Reader will be inſtructed in the Nature of it, as it is a very curious Grain, and alſo in what relates to it in particular, as it undoubtedly is the moſt uſeful of all Grains in theſe Parts of the World; if not of all Grains in the whole World; to which Title it ſeems to have a Right to put in a very fair and juſt Claim.

Of Wheat in general.

There are three Things which chiefly make any Thing much eſteemed by, and truly valuable amongſt Men:

Firſt, The real Uſe and Benefit of it.

Secondly, The Eaſe with which it is to be acquired. And,

Laſtly, The intrinſick Excellency of its own Nature.

All which good Qualities, or Properties, Wheat is poſſeſſed of in a very eminent Degree.

As to the real Uſe of Wheat we apprehend is that which not only in general ſupports the very Life of the greateſt Part of Mankind, but alſo ſupplies us with numerous other Conveniencies to make our Lives eaſy, comfortable and happy; affording us Strength, Health and Pleaſure; being the beſt Nouriſhment, and our chief Support as to what is eatable; and alſo affording us excellent Malt for Drink, whenever it is thought proper to uſe it for that Purpoſe. It grows in almoſt all Countries, and in ſuch a Variety of Soils, that very few Places need to want it: and to uſe the learned Dr. Derham's Words, ſpeaking of the Bleſſings we enjoy, he ſays, "Among Grains "I might name the great Fertility of ſuch as "ſerve for Bread, the eaſy Culture and Propa-"gation thereof, and the Agreement of every "Soil and Climate to them."

As to the ſecond Article, The Eaſe with which it is to be acquired.

Two Things may properly fall under our Conſideration:

Firſt, The uſual Labour and Expence neceſſary for the obtaining a Crop of Wheat. And,

Secondly, The Quantity it generally produces.

As to the Expence and Labour neceſſary to procure it, they are ſo well known in general, that they will not deter the Farmer from endeavouring to obtain it; they being generally ſo full of the Expectation of the Profit of it, as to want no Encouragement to attempt the cultivating it: thus generally depending on the Profit of a Crop of Wheat to pay two Years Rent, and the Huſbandry neceſſary for the three Years in the old Courſe of Tillage. The Particulars neceſſary to be known in this Reſpect, will fall under Conſideration when we come to treat of the Ways and Means preparative to it. However, on a general Eſtimate, ſuppoſing two Years Rent and Accidents one Pound five; Plowings, Sowing and Reaping one Pound five; Seed and Weeding fifteen Shillings; Manuring it one Pound fifteen. This whole Expence would amount to five Pounds; and reckoning the Farmer to have but four Quarters and a half,

half, and that to be ſold at thirty Shillings, he is paid for all his Labour, and has one Pound fifteen Shillings clear Profit; for the Straw is ſufficient to pay for the Thraſhing.

Of the Quantity of the Produce of Wheat.

If we conſider what great Quantities of Wheat have been produced both formerly and of late Years, in ſome extraordinary Inſtances; and alſo what may reaſonably be expected commonly from it, in a Courſe of good Huſbandry, on Ground proper for it; what has been before mentioned will appear a very moderate Computation of the Profits ariſing from an Acre of this Corn.

The Inſtances mention'd by Pliny of the Fertility of Wheat, are yet too remarkable to be omitted; "Nothing, ſays he, is more fruit-"ful than Wheat (which is the chief Support "of Mankind) from one Buſhel one Hun-"dred and Fifty are produced; and the Pro-"curator ſent to Augustus (which is ſcarce "to be credited) one Grain which had about "Four Hundred Stems; and another was ſent "to Nero which had Three Hundred and "Fifty."

To which I ſhall take the Liberty to add a Paragraph relating to the Uſe of Wheat, from the ingenious Dr. Derham, in the following Words:

"Among the many Contrivances for Food, "I cannot but attribute that univerſal Aliment, "Bread, to the Revelation; or, at leaſt, the "Inſpiration of the Creator, and Conſervator of "Mankind; not only becauſe it is a Food uſed "in all or moſt Parts of the World; eſpeci-"ally becauſe it is of incomparable Uſe in the "great Work of Digeſtion, greatly aſſiſting the "Ferment, or whatever cauſes the Digeſtion of "the Stomach." Of which take this Example from the noble Mr. Boyle, "The extracted "Menſtruum from Bread alone, that would "work on Bodies more compact than many "hard Minerals; nay, even on Glaſs itſelf, "and do many Things that Aqua Fortis could "not do: yet by no means was this ſo corro-"ſive a Liquor as Aqua Fortis, or as the other "Acid Menſtruums." The Way of preparing this is deliver'd in Harris's Lexicon.

We need not go ſo far backward for Inſtances of extraordinary Fertility of Wheat, ſince in our own Country, Mr. Evans, of Southampton, had from one Corn eighty Ears, containing about Four Thouſand Grains, ſome had ſixty, and ſome had ſeventy Grains; and he had on the whole about ſix and twenty Quarters on an Acre, when the Corn was ſet at ten Inches Diſtance.

Mr. Hamilton mentions, that on trying Mr. Mortimer's Receipt for ſteeping Wheat in Water, Pigeon's Dung, Nitre, &c. though but little of it appeared above Ground, what came up branched ſo, that he could number forty Stalks from one Grain; every Head was very long, and the Grain large; "I planted it, ſays "he, about ten Inches diſtant, I don't doubt if I "had given half the Seed, that I ſhould have "had a very large Crop."

There have been ſeveral Inſtances much of the ſame Nature, but not to inſiſt on theſe extraordinary Caſes; we are well aſſured of there being eight or ten Quarters or more on an Acre in Cheshire, and in other Places, on Lands well huſbanded and carefully managed. And Miller mentions eight or ten Stalks from one Corn, and eight, ten, or twelve Quarters of Wheat on an Acre as no uncommon Thing, both in his own Caſe and in that of others, which he has ſeen and obſerved.

This laſt Summer I have taken up Wheat both in Hertfordshire and Essex, with eight Stalks and under from one Corn; ſome of which had thirty odd Corns in an Ear, and ſome above forty, which ſome of the Owners had never obſerved, but then counted, and only before thought the Corn heavy: fifty to a Stalk comes to Mr. Evans's Calculation of four Thouſand for one; and at eight Stalks, forty five in an Ear, will be three Hundred and ſixty from one.

The ſeveral Calculations after mentioned, from the Grain when ſet at different Diſtances, will probably give the Reader a clearer Notion of what Produce may be reaſonably expected from an Acre of Land as differently ſown or ſet, than any Inſtances of what others have obtained will do; and therefore we ſhall only here add the Caſe of Mr. Yelverton in Ireland, who had the Reward allowed for the Perſon who ſhould produce the moſt and beſt Wheat on an Acre of Ground in that Kingdom; by which the Reader may ſee what may be gained by a proper Management of Land, in the Method that Gentleman took in the Ordering of it.

Mr. Yelverton in 1742, had the Prize in Ireland, having ſix Hundred ſixty-eight Stone and eleven Pound of Wheat off of one Acre.

The Method he took was to change his Seed; then he ſowed it not too thick; and he mowed it.

The Seed was ſteeped the Evening before the ſowing it in a Pickle, and he riddled hot dry Lime over it as uſual.

The Pickle was thus made;

Take Rock Lime and Bay Salt, put them together in a large Veſſel: then throw in a ſufficient Quantity of Urine, ſtill ſtirring them till it diſſolve the Salt, and ſlake the Lime; let them continue ſo twenty-four Hours, and then let the Liquor run out into another Veſſel for Uſe.

The Corn ſhould remain from Night to Morning in this Pickle before ſowing.

This Liquor prevents the Smut, and deſtroys a pernicious Inſect, which he calls the ſmall red Worm, often deſtructive to Seed, eſpecially in rich old Grounds.

I preſume, that in this Caſe the Lime and Bay Salt qualify the uſual Effects of the Urine, which, when uſed alone, is ſubject, as many have obſerved, to prevent the Wheat from growing. This I have alſo experienced myſelf in ſome Trials of that Kind, though at the ſame Time I have found the Seed grow when the Urine has been mixed with half Water.

After giving the Reader this general View of Wheat, and ſome particular Accounts of its Produce; we ſhall now proceed to conſider this noble

noble Grain in a more particular Manner, by tracing it from its Origin in the Seed, through the ſeveral Stages by which it paſſes to its full Maturity; and in this Courſe we ſhall endeavour to comprize whatever is neceſſary or worthy to be known relating to it; the whole of which we ſhall comprize under the following Heads:

In the firſt, We ſhall conſider the Nature and Contexture of it; with the Manner of its Growth.

Second, What Ground is proper for it.

Third, How the Ground is to be prepared to be moſt agreeable to it.

Fourth, How the Wheat is to be prepared for the Ground.

Fifth, How they are to be ordered whilſt they continue together.

And laſtly, How the Wheat is to be managed when ſeparated from the Ground.

But before we enter into the Account of its Nature and Growth, it will be proper to give a Deſcription of it, and to mention the ſeveral Sorts of it, and which of them are the moſt commonly propagated.

Wheat is an Annual Plant, tall and ſlender in the Stalk, with graſſy Leaves and a heavy Ear; the Root is fibrous, and the Stalk hollow. The Conſtruction of the Ear is this. Each Huſk is compoſed of two Leaves, or Valves, which are of an oval Form, and generally contain three Flowers. Each Flower is compoſed alſo of two Valves; the outward one belly'd, the inner flat. In this ſtand three Filaments, with little duſty Knobs ſplit at their Ends. In the Centre of theſe is placed the Rudiment of the Grain. From this riſe two Filaments, which are feather'd at the Top; theſe catch the Male Duſt that afterwards impregnates the Seed. The Seed ripens by Degrees after this, and the two Valves of the Flowers retain it till it is ſeparated by Time or Force.

The ſeveral Sorts of Wheat are;

Firſt, White or red Wheat, without Awns.

Second, Red Wheat, in ſome Places called Kentish Wheat.

Third, White Wheat.

Fourth, Red ear'd bearded Wheat.

Fifth, Cone Wheat.

Sixth, Grey Wheat, in ſome Places called duck-bill Wheat, and grey Pollard.

Seventh, Polonian Wheat.

Eighth, Many ear'd Wheat.

Ninth, Summer Wheat.

Tenth, The Wheat called naked Barley.

Eleventh, Six rowed Wheat.

Twelfth, Long ear'd Wheat.

Thirteenth, White ear'd Wheat.

Theſe are ſtrictly ſeminal Variations, not diſtinct Species; nor are ſeveral of them of any great Moment in general; but we thought it proper to mention them all in a Work of this Nature.

The firſt ſix Sorts commonly grow in England; but the firſt, the fourth and the fifth, are the beſt worth cultivating here; as being very hardy, and affording a greater Quantity of Flour than the reſt. The Cone Wheat is to be preferred to all, as having a larger Ear and fuller Grain than any other, and is the Kind moſt ſowed near London.

Some prefer the third on Account of the extreme Whiteneſs of its Ears, and ſome the bearded, as thinking it leſs ſubject to mildew; but of this there is no Certainty.

The Polonian Wheat is little cultivated now to what it was formerly; nor is there any Reaſon known why it is omitted.

The eighth is little cultivated here, though much in Italy and Sicily; ſome Stalks of it have ſeven Ears, and it has commonly three or four; which often occaſions its being laid.

The Summer Wheat is ſown in the Spring, and is ripe as ſoon as the other; but not producing ſo great a Quantity of Flour as ſome of the others, it has been neglected, tho' it may be very proper when the other miſcarries.

The tenth Sort is little cultivated, the Grain being thin, and the Flour coarſe; but it is very hardy, and will grow upon any Soil.

The ſix rowed Wheat is not very common, the Ears are but ſhort, and have each ſix Rows of Grains in them.

The twelfth Sort is cultivated in ſeveral Parts of England, and much in Wales; the Grain is pretty long, but not ſo full as ſome other Sorts, it has a greater Quantity of Chaff, and the Awns of it are as long as thoſe of Rye.

To theſe we ſhall add the following Varieties of the others:

1. Egg-ſhell Wheat; this is reckoned beſt for light Lands, and to be mixed with Rye for Maſlin, it being early ripe.

2. The Double-eared Wheat; this proſpers beſt in a heavy Clay, or a loamy Soil.

3. The Red or Kentish Wheat; this is much ſown in Hertfordshire.

4. The Great-bearded Wheat, which thrives well on a heavy Clay.

5. The white Pollard Wheat.

6. The Flaxen or Lammas Wheat.

Egg-ſhell Wheat is reckoned the beſt of all others for yielding the whiteſt Flour, and makeing the beſt of Bread; it will grow well in a loamy Earth, and in gravelly, chalky, and ſandy Loams; it ſuits light Lands beſt, and is generally early ripe.

As to Red Lammas; as Wheat is the King of Grains, ſo this has been eſteemed hitherto the King of Wheats. It grows beſt in the richeſt Vale Lands, or blue Clays, where I have ſeen it near five Foot high, yet it is ſown by many in Up-Land dry Loams, and even in ſome Gravels, that have been before dreſſed extraordinary well: and this is that noble Sort whoſe Kernels are ſomewhat longer than Perky Wheat, and near as big as Cherry-ſtones. When ſown in a right Soil, will out-weigh Perky, but turns not out ſo much Flour; it is ſix Inches taller, and ſo ſubject to fall.

Yellow Lammas has a white Straw, and a red Ear; the Flour is near as white as that of the other Lammas; it will grow on Chalks, Gravels and Clays, and other poorer Lands better than Lammas.

Perky has a white Straw, a white Ear, and a red or yellowiſh Kernel, more round than Lammas. It comes into Repute as it will do well in

chiltern Grounds, chalky and gravelly Soils, well dreſſed; it will do in poorer Ground, and turn out as much, and is not ſo ſubject to blight. The Vale Farmers now find that it yields more than Lammas, is hardier, and will grow in a coarſer Tilth, in a proper Soil, and will do with leſs dreſſing than Lammas. It bears late ſowing beſt, and is to be ſown after artificial Graſſes, Peaſe, Beans and Turnips with one Plowing.

White Wheat has a white Straw, and a white thick Ear; its Kernel is as big as Perks. It grows cloſer together than red Lammas, and ſo is better ſecured from Blights. It has two or three Chaffs, which ſecure it againſt Flies. It thrives well in incloſed, poor, gravelly, chalky and light loamy Soils; and is much ſown and mixed with red or yellow Lammas: it weighs lighter, but makes more Flour than the Perks or Lammas. Bakers mix them. It will grow well both in vale, ſwampy and ſtiff Soils, and in chiltern dry Grounds.

Duck-bill or Dugdale Wheat has ſeveral Names, and has a darkiſh brown guttery Kernel, rather bigger than other Wheat, the Chaff, by its Sharpneſs, hurts the Horſes Mouths. It is ſown in Vale and Chiltern Ground, in wet and dry Loams, which are made rich with Manures, for a poor Soil agrees not with it; it is bulky and ſubject to fall, but folding on it makes it ſtand.

When ſown on a fine well dreſſed Tilth, it produces a great deal of Grain; its Flour is of the coarſeſt and heavieſt Sort: it may be ſown in October, and even to February or March you may ſow any of the Pirks or white Wheats.

There are ſeveral other good Wheats in different Parts of the Kingdom, known under various Names; and ſeveral of the above-mentioned Sorts are called by different Names in various Places; and ſeveral of them are ſo mixed in ſowing, that many large Farmers are not acquainted with the diverſe ſeparate Sorts, or their proper Names: nor do I perceive there is any Objection made to their mixed Corn when brought to Bear-Key.

That called Cone Wheat is certainly a very good Sort, but the London Bakers think it too ſweet to have a great deal of it in the Flour they make their Bread of; they generally buying it in Flour, and Whiteneſs being a great Article, prefer the red Wheat, and mix them, if neceſſary. Thoſe who will not go to the Price of the beſt put in Allom, which gives the Bread a Whiteneſs, but a poor dry Taſte.

The Perſian Wheat may be mentioned as a Curioſity, it having five Heads on one Stalk, one in the Middle as long as the Ears of our Wheat, and two on each Side about an Inch long; it is raiſed ſometimes in the Gardens of the Curious: Mr. Hamilton planted ſome of it on his coldeſt Soil in Scotland, having firſt mixed unſlacked Lime with Horſe Dung prepared ſome Time before, with the Earth it was planted on, which brought it to its full Maturity.

All Farmers agree that ſome of theſe Sorts of Wheat thrive beſt on ſtrong ſtiff Land, and other Sorts do beſt on a light Soil; ſo that it behoves the Farmer to ſuit his Wheat to his Soil, or work his Soil in the beſt Manner poſſible to ſuit the Grain; and perhaps the doing this right may require the beſt Judgment and Skill of any one Article in Huſbandry.

There is frequently a great Variety of Soils in Lands lying together; nay, even in one and the ſame Cloſe at a very little Diſtance; ſandy Soils on the one Side, ſtiff Soils on the other, wet and oozy in the Middle.

After this general View of the different Sorts of Wheat, and of the Soils ſuitable to them: we ſhall proceed to treat of it in the Method before mentioned, and firſt conſider how Corn grows.

How Corn grows.

To know how Corn grows, Experiments have been made of ſeveral Grains; and Seeds of various Species have been cauſed to vegetate in the open Air, without any Aid or Aſſiſtance from the Earth.

The Seed on theſe Occaſions is laid on a light Lay of Wool, ſpread on a Plate with Holes in it; on the Mouth of a larger Veſſel filled with clear Water, and after repleniſhed with more as neceſſary, which draw up an Humidity into the Wool, that ſupplies the Place of Earth, and nouriſhes the Seeds.

I have tried the Experiment myſelf with a brown Pot full of Holes like a Cullender, placed over, or rather in a larger Veſſel near full of Water; and it is very well known that the common Warmth of the Sun raiſes a conſiderable Quantity of Wet into the Air; which, in this Caſe, muſt paſs thro' the Holes in the brown Pot, and ſo keep the Wool moiſt. And it is alſo found by the exacteſt Experiments, that all Waters ſo carried up, conveys ſome fine earthy Particles with them.

In a few Days the Wheat, Grains, and Seeds will begin to vegetate; and extend, by ſlow Degrees, their Roots towards the Water, where they imbibe, however, a leſs Quantity of Juices than they would from the Earth. Yet they will proſper in that Situation, eſpecially if the Water be frequently changed.

I have compared the Reſult of thus placing Seeds on Wool, and ſowing them in the Earth, and find their Progreſſion to be much the ſame.

When a Seed has been about two Days in the Earth, the Juices with which it is ſwelled are imparted to the Bud, and cauſe it to grow.

The Bud is always ſituated in one of the extreme Parts of the Seed, and that Part which lies neareſt the Surface is the ſmall Root of the future Plant. That on the other Hand which is next the internal Subſtance of the Seed, is its Stem and Head.

The Subſtance of all Seeds in general conſiſts of two Pieces, generally called Lobes, and which at firſt are united by one common Covering; the Structure whereof is more or leſs ſolid. Theſe after ſeparate and ſerve as ſeminal Leaves to the Plant, and then wither and decay when the Plants have no farther Occaſion for them; and theſe Obſervations may ſoon be made of divers Species of Beans and Peaſe.

The Bud of a Grain of Corn which has been lodged in the Ground, begins for the moſt Part in about four and twenty Hours, or ſomewhat more, to burſt its Foldage, and to diſengage itſelf; after that it ſhoots out its Root and Stem.

The Root at firſt is incloſed in a Sort of a Purſe, thro' which it breaks its way: two other Roots within the Space of a few Days ſhoot forth from the Sides, and each of them burſts through the Covering wherein they were infolded.

All theſe three Roots are ſhagged with a vaſt Number of Filaments, which wind themſelves about the little Clods of Earth which they meet with in their Progreſs.

By this cloſe Adheſion they draw whatever is nutrimental to the tender Plant.

As to the Stem, that ſhoots upwards in a perpendicular Line; there are ſeveral appearing Reaſons for the Deſcent of the Root, and Aſcent of the Stem offered by Writers; but there are not any two Things more unaccountable in Nature, than that of Seeds turning themſelves downward in order to ſtrike their Roots into the Earth; and the Stem aſcending directly upwards, contrary to all the Laws of Gravitation.

Corn will begin to ſhoot a ſmall verdant Point out of the Ground in five or ſix Days Time at the fartheſt after it is ſown.

This little Stem is no more than a ſmall Parcel, or Packet of Leaves folded one upon another all round the Ear; which remains for ſome conſiderable Time inviſible, and is lodged in the Heart.

Tho' the firſt Leaf of this Packet opens a little toward the Point, yet the lower Part is always confined, and rolled up in the hard Tegument from whence it ſprings.

Some few Days after, the Covering of the Seed begins to waſte away, and the Purſe wherein the Roots were contained, decays and dies away when it has performed its Offices.

When the Leaves are duly unfolded, we may plainly perceive the firſt Draught, or imperfect Sketch of four Tubes, which form the Stem; and at the Bottom we may likewiſe diſcover the Bud of the Ear.

From the firſt Knot which lies neareſt to the Roots, ſhoots out a Leaf, which performs the Function of a Covering to a ſecond Tube; at the third Knot begins another Leaf, which covers the fourth Tube and the Ear.

The Interſtice between the firſt and ſecond Knot neareſt the Roots, is then much larger than that which ſeparates the ſecond from the third.

On theſe Tubes thus jointed as it were, or ſet one into another, the Ear riſes; which may be diſtinguiſhed with Eaſe by its round tranſparent Grains, which bear the Reſemblance of ſo many little Pearls.

At length the Ear ſhoots from the Foldage which ſkreened it from the Air, and the ſeveral Bags or Lodgments which are appointed to contain the Subſtances of the future Grains, begin to be dilated.

Theſe Lodgments ſhoot out ſlender Bodies for the Reception of the Powders from the Packet of Chives, which make their Appearance above, and render the Buds prolifick.

When the Buds have dilated in thoſe Lodgments, that mealy Subſtance to which they are united by ſeveral Filaments, which may with Propriety be termed the ſeminal Roots, the Foldage and the firſt Leaves which extracted from the Earth and Air ſuch Juices as were proportioned to the delicate Structure of the Stem, begin to waſte away.

The Stem then operates more powerfully by itſelf, it exhauſts from the Leaves their nutritious Juices, with a View to enrich the Ear which it ſupports.

It is Matter of Admiration, that ſo valuable an Ear ſhould be ſupported by ſo tall and ſlender a Stem; which is deprived of all Manner of Shelter and Protection, and is planted in the Midſt of an open Field, where all the Winds have in their Turns full Power to blow it down.

This Grain often aſcends to the Height of four or five Foot from the Ground; and tho' the ſmall Stem has no more that two twelfths of an Inch for its Diameter, yet it is contrived according to the ſtricteſt Rules of good Œconomy, for by this Means a ſmall Field will contain an infinite Number of Ears.

This Stem, however, as ſlender as it appears to be, has been formed with ſuch Art and Ingenuity, that it is thereby preſerved for ſeveral Months ſucceſſively unhurt; notwithſtanding its being openly expoſed to Storms and Tempeſts, and to all the various Fluctuations of the Air.

Four Knots of a hard Subſtance reſembling the ſame Number of ſtrong Bands, make it as firm as it is neceſſary, without rendering it in the leaſt unpliant: it is flexible enough, and qualified to bow without breaking, not only under a common Gale of Wind, but even under the Shock of the moſt ſudden and impetuous Blaſts.

By the Aſſiſtance of its Knots it is enabled to recover its firſt Poſition, as ſoon as the Storm is over; and it is a very agreeable Sight to view this Foreſt of Ears under a gentle Agitation of the Wind: each ſucceſſive Breath of Air makes them bow in their Turns, and ſeem to roll along the Field like the Waves of the Ocean.

The Ear is formed with no leſs Art and Judgment than the Stem; the Grains which are in them are ranged one above another, at equal Diſtances, in order that they may receive an equal Proportion of Nouriſhment and Support. They are alſo concealed and ſecured under various Teguments, which are thick enough to break the Force of the Sun's Beams, and are ſo cloſely joined together, that they can exclude and throw off thoſe Dews and Rains which would otherwiſe oblige them to ſhoot out.

Several of theſe Teguments terminate in as many Points of different Sizes; which, as ſome imagine, are little Ducts or Channels, intended to introduce into each Lodgment a ſufficient Quantity of Air; and, according to the Opinion of others, they form a kind of Paliſade againſt the Depredation of the little Birds.

I am apt to believe that theſe Points, or Beards of Corn, are appointed to withſtand and break the Force of thoſe heavy Drops of Rain which fall upon them; by which Means they are diſcharged from each Side, and from the Surface, inſtead of penetrating to the Bottom of the Lodgments of the various Grains, which would putrify was the Humidity to continue among them for any Time.

The Proceſs of Nature in the Vegetation of Plants, as exemplied in a Grain of Wheat, is as follows.

The firſt Day the Grain is ſown it grows a little turgid, and the Huſk gapes in ſeveral Places, and the Body of the Plant ſwells, and the Gem or Sprout opens and encreaſes, and the Roots begin to bunch out, and the Placenta, or Seed Leaf becoming looſe gapes.

The ſecond Day, the Secundine or Huſk, being broken through, the Stem or Top of the future Straw, appears on the Outſide thereof, and grows upwards.

The third Day the Pulp of the Conglobate, or round Leaf, becomes turgid with the Juice it has received, from the Earth fermenting with its own.

The Stem from whiteiſh turns greeniſh, the lateral Roots break forth greeniſh, and the lower Root grows longer and hairy, with many Fibres growing out of it.

Hairy Fibres hang all along on all the Roots, except on the Tops, and theſe Fibres wind about the Particles of Soil like Ivy, whence they grow curled; above the lateral Roots two other little ones break out.

The fourth Day the Stem, mounting upwards, makes a right Angle with the ſeminal Leaf, the laſt Roots put forth more, and the other three encreaſing have more Hairs, which cloſely embrace the Lumps of Earth, and where they meet with any Vacuity, unite into a Kind of Network; the Leaf is now ſofter, and when bruiſed yields a white ſweetiſh Juice, like Barley Cream.

The fifth Day the Stalk ſtill riſing puts forth a Stable Leaf, which is green and folded, the Roots grow longer, and there appears a new Tumour of a future Root; the outer Huſk, or Sheath, is looſened, and the Seed Leaf begins to fade.

The ſixth Day, the Stable Leaf being looſened, the Plant mounts upwards, the Sheath ſtill cleaving round it like a Bark; and the Seed Leaf is ſinuous or wrinkled, and faded.

After the eleventh Day the Seed Leaf, as yet ſticking to the Plant, is crumpled and almoſt corrupted, within it is hollow, and about the Secundine, the Mucus and white Subſtance of the Seed being continued to the navel Knot, form a Cavity; all the Roots becoming longer put forth new Branches out of their Sides. The ſecond Leaf withers, and its Veſicles are emptied; the Spaces between the Knots grow longer; new Gems appear; and the middle Root grows ſeveral Inches longer.

After a Month, the Roots and Stalk being grown much longer, new Buds break out at the firſt Knot, and little Tumours bunch out, which at length break out into Roots.

The Roots which grow are generally according to the Goodneſs of the Ground, and the Compaſs allowed for the Grain of Corn to extend itſelf in; MILLER ſays he has traced a Root to the Extent of a Yard, which is farther than I could ever trace one; but with the Allowance which may be proportionably made for the very fine Threads, which could not be taken up. I think I have found ſome extend two Foot in Length or near it.

Four, five, or ſix Stems are what is commonly to be met with in the uſual Courſe of Huſbandry; each contain, if tolerably good, from thirty to forty Grains or upwards; as I have counted them this Summer both in HERTFORDSHIRE and ESSEX.

I have ſometimes met with eight Stems from one Grain, in Corn ſown in the common Way which is about three Hundred for one; but that is not very uſual. We ſhall have Occaſion to mention this again when we come to compare the different Produce ariſing from various Grounds, and from Grain ſowed at different Diſtances, in one and the ſame Grounds: and therefore ſhall proceed to our ſecond Head: that is,

How the Ground is to be prepared for Wheat.

This being a Point of the laſt Importance to the Farmer, requires a particular Conſideration; eſpecially as the New Huſbandry gives a quite different Method of Management in this Matter; and more eſpecially as ſome new Ways of Proceedings in this great Article have very lately been introduced, and are juſt now ſtruck out by ſome ingenious Farmers, which I apprehend very well deſerve to be ſet before the Reader in a proper View.

The uſual Method of preparing the Ground for Wheat, was formerly by plowing it three, four, or five Times, and dunging it when neceſſary. This, in general, anſwered very well, when proper Regard was had to the Nature of the Soil, and the different Seaſons which happen; ſince it has been found, by repeated Experience, that both Froſts and Snows have great Influence on Corn Land, both in the Reſpect to the neceſſary plowing it, and alſo as to the certain enriching it when the Snow falls and lies on it.

For the Froſt, when to any moderate Degree, certainly lightens the Ground ſo much, that the uſual Plowings have undoubtedly a much better Effect on it for Wheat; and when it continues any Time, it makes the laſt Plowing unneceſſary, or indeed proper for ſome Sorts of Grounds, as is evident to every experienced Farmer. And MILLER is of Opinion, that the Ground for many Years after the great Froſt, required leſs Plowing than it did before.

Froſt not only lightens the Earth, as before mentioned, but makes it more ſuſceptible of the Air, which certainly not only conveys an unaccountable Quantity of rich Nouriſhment into the Soil; but by its working Power ſtills looſens and lines the Particles of it after a very extraordinary Manner; for though it may be hard to ſay what it is, or however difficult it may be to name or deſcribe it, the beneficial Effects of it

are found beyond Diſpute, which are really ſo great, that ſome of our moſt judicious Writers, and beſt Farmers are of Opinion, that the great Uſe and Benefit of plowing, digging, and ſo frequently ſtirring the Ground, is principally to make it more capable of imbibing or receiving the Benefit conveyed to it by the Fertility occaſioned by the Air and Dews; the Truth of which every one may be convinced of, who will only conſider the Riches acquired by his barely fallowing his Land, without any Manure at all; and that it is common to ſee, in many Places, Land worn out with Tillage, made again proper for it, by only lying ſome Years uncultivated.

A proper Fineneſs for the tender Roots of Grain to ſtrike in, is abſolutely neceſſary; but this, in many Caſes, might be effected without many plowings.

And indeed all obſerving Perſons agree, that the Air, Rains, and Dews, are replete with great Variety of Particles which are eaſily made viſible, and which have very ſurprizing Effects both in and upon the Earth, and in and upon Vegetables.

The curious Dr. Hale found, That a cubic Inch of blue Clay being diſtilled, an hundred and eight cubic Inches of Air were raiſed from it.

This wonderful and important Fluid the Air, is found to be very operative in every Part of Nature, whether Animal, Vegetable, or Mineral.

It is well known that common Air is frequently impregnated with moſt noxious Vapours, thus the Fumes which aſcend up in the Air from fermenting Wines are very pernicious, and thoſe from burſting Brimſtone deadly.

That it is by the amphibious Property of the Air, that the main and principal Operations of Nature are carried on; for a Maſs of mutually attracting Particles, without being blended with a due Proportion of elaſting repelling ones, would, in many Caſes, ſoon coaleſce into a ſluggiſh Lump.

Mr. Boyle mentions to what a great Number of Miles an Inch of Air may be rarified, and the Force of Fire Engines are viſible now in moſt Countries.

If any Perſon has a Mind to ſee the Effect of Water expanded, he may juſt wet a Bullet Mould, and then pour in a little boiling Lead, which will fly out with prodigious Force; I have ſeen it ſtrike into a ſolid Stone, but whoever tries it muſt be careful to ſecure themſelves, and all about them, from the Danger of its flying on them, if the Hole be any way toward them.

We ſee the great Power of expanding Water, when heated in the Engine to raiſe Water by Fire; and Water with Air and other active Particles in capillary Tubes, and innumerable ſmall Veſicles, do doubtleſs act with a great Force, though expanded with no more Heat than what the Sun's Warmth gives them.

Peaſe in a Pot near full with Water, on imbibing the Water, have raiſed one Hundred Eighty-four Pound Weight laid on them; by which we may ſee the vaſt Force with which ſwelling Peaſe expand. And it is doubtleſs a conſiderable Part of the ſame, which is exerted not only in puſhing the Plume of a Plant upwards into the Air, but alſo in enabling the firſt ſhooting Radicle of the Pea, and other Grain, and all the ſubſequent under Fibres, to penetrate and ſhoot into the Earth; thoſe two very ſurpriſing Powers in Seeds and Plants which we mentioned before, and ſhall hereafter conſider.

But though we have from theſe Experiments, and from common Obſervation, many Proofs of the expanſive Force with which the fibrous Roots of Plants ſhoot; yet the leſs Reſiſtance theſe tender Shoots find, the greater Progreſs they will certainly make in equal Times.

Dr. Woodward, and others, hence juſtly obſerve (as we before hinted) that one of the moſt conſiderable Uſes of plowing, fallowing, and trenching, and of harrowing of Ground; and of mixing Lime and ſeveral other Compoſts, is to looſen and mellow the Earth, that not only the Roots may make eaſier Shoots, but there may be a freer and readier Admiſſion of the Dews, Rain, and Air, which are found to have ſuch ſurprizing beneficial Effects. For the Air has as great and expanſive a Force as Water, as is proved by many Experiments.

Notwithſtanding this general Truth, a proper Conſiſtency or Stiffneſs of the Soil, ſuitable to the Grain ſowed, muſt be preſerved; ſince otherwiſe Wheat, and ſome other Grains, will fall. To prevent this good Farmers frequently roll the Ground when neceſſary, and ſometimes fold the Wheat with Sheep, which Practice confirms the Truth and Uſe of the Obſervation.

Could we once find out what Conſiſtency or Stiffneſs each Grain requires, and the Degree and Sort of rich Nouriſhment moſt ſuitable to them reſpectively; Tillage would be managed with greater Eaſe, with much more Certainty of Succeſs, and with greater Profit.

Theſe indeed are brought in general to a tolerable Degree of Certainty, as to the Nature of Lands proper for Wheat, Beans, and ſome other Grains; and ſome general Rules of fitting Lands with proper Quantities of Marle, Lime, Chalk, Soot, and Aſhes, are pretty well aſcertained; but yet every Way there is ſtill a large Field open to the thinking Farmer, for the farther better proportioning his Manures to his Lands, than are yet known; and which vary ſo much as to make a particular Application of more or leſs, in almoſt every different Field, fit to be obſerved.

It may not be improper to caution the induſtrious Farmer, againſt over-manuring his Land with any Sort of Improvement, for when Land is made too rich, he will not meet with a good Crop of Corn, but is ſure to find a plentiful one of Straw; and this is the Reaſon why Farmers, when they are to break up rich Land, generally firſt take off the Edge of it (as they call it) by firſt ſowing it with Oats, before they ſow it with Wheat; and a very good Farmer aſſured me, that he had loſt above fifty Pounds in his younger Years, by making his Wheat Land too rich.

Marle, Lime, Chalk, and Salt, are in themſelves excellent Preparatives of the Ground for Wheat, when properly applied, as has been before mentioned; but what is peculiarly beneficial in theſe is, that they convey no Seed of

Weeds, no Inſects or perniciousVermin, nor any thing to four the Ground, they are brought on or mixed with, but rather help to deſtroy the Vermin, and likewiſe ſweeten as well as enrich the Soil they are brought to.

And what is equally beneficial, the Courſe of Huſbandry which theſe require, in order to procure the conſtant greateſt Profit from their Improvements, gives the Farmer an Opportunity of obtaining the continued Advantage of them, without making his Land foul, or filling it with pernicious Weeds.

Thus for Example, Clover, which is found ſuch an admirable Preparative for Wheat, requires no ſuch Culture or Manure, as will give any annual or other Weeds an Opportunity of running to Seed, and ſo propagating themſelves over the Field it is in; it may be improved oft without any Danger; but if the Farmer ſhould lay a little fine Dung on it at Michaelmas or in February, yet the Clover being almoſt perpetually mowed firſt, either for Seed or Graſs, that early mowing will cut off any Weeds which may get in it, before they can Seed. And as the Tops of Clover are generally large and flouriſhing, ſo they over-ſhadow and keep down the Weeds; and if any Sourneſs ſhould be conveyed by ſuch a Manure, the Clover Tops, and deep Roots, will mellow it before it is plowed up for Wheat, for which one plowing is commonly ſufficient.

Much the ſame may be ſaid of Turnips, another excellent Enricher of the Ground, and Preparative for Corn, whoſe large Head over-ſhadows and keeps under Weeds; and the repeated Hoeings neceſſary in the Management of them, clear the Ground exceeding well from all Weeds and Trumpery, at the ſame Time that their large Roots are ſold to great Profit, or prodigiouſly enrich the Soil, and frequently anſwer both thoſe Purpoſes.

A ſenſible Farmer of my Acquaintance, ſowed Turnips on his Heap of Dung and Soil, ſolely with a View to keep down the Weeds, not with any Expectation of Profit from the Turnips, though, on our taſting them this October, when of the Size of a large Apple, they were pretty good, and not ſo ſtrong as we expected them to be.

Beans and Peaſe are alſo excellent Preparatives for Wheat: a good Crop of Wheat is generally depended on after a good one of Peaſe.

And here I cannot omit to mention a very extraordinary Inſtance of a new Improvement in the Courſe of Huſbandry, begun by a Farmer near Chelsea, this Spring.

He ſowed his Ground with Peaſe in Rows as uſual, and as near as I can gueſs, by what remained of the Turnips, at about twenty Inches diſtance; and when the Peaſe were grown up a little, he ſowed the Interſtices betwixt them with Turnips, and after, as I was informed, let the Peaſe reſt on the Tops of the Turnips; he after reaped the Peaſe, and ſold Part of the Turnips, and on the twenty-ſecond of this October I ſaw two Teams plowing this Ground; one of which, with ſix Horſes drawn double, plowed up a Furrow of eleven Inches deep, and twelve broad; and the other, with two Horſes, followed and plowed the Rubbiſh about two Inches deep, turning it, and all the remaining Turnips, into the Bottom of the great Furrow.

Many of the Turnips plowed in were very large, and few leſs than the largeſt Apples; the Servants told me their Maſter thought the Turnips would be as good as half a Mucking, and that he intended to ſow it as it now lay, and then to harrow it; there was no Appearance of any Rubbiſh on the Top of all that was finiſhed by the Plows.

What the Succeſs may be cannot be foretold, but in this Procedure, there appears all the ſubſtantial Benefit of Horſehoeing, as well as of giving the Wheat that Diſtance, which we are promiſed will procure us ſuch advantageous Crops; the Furrows being a Foot diſtant from each other, betwixt which moſt of the Corn will fall, after whatever Manner it is ſowed.

However, from this Experiment, a judicious Farmer may eaſily take ſeveral Hints which may be of great Service, in a Variety of other Articles.

Lentils, and ſeveral other Grains and Graſſes, are very good Preparatives for Wheat, when plowed into the Ground, or eaten on it, which different Farmers order according to their different Inclinations; and all may be of Uſe for Wheat, as will be particularly mentioned when theſe ſeveral Articles come to be ſeparately conſidered: but Wheat does not love to follow common Barley, as it makes the Land too light for it, and alſo takes too much of its Goodneſs from it: it ſeldom does well after it, though the Ground be in good Heart.

I ſhall mention but one Article more under this Head, which is that of plowing, and this having been copiouſly treated of before, I ſhall ſay no more of it than what ſeems abſolutely neceſſary and requiſite to inform the Reader, of what I apprehend an almoſt new Method of managing this Sort of Grain.

The Herefordshire Farmers generally plow five Times for Wheat, and ſhallower or deeper as Occaſion requires: and all agree it is improper to plow in Rain or Snow.

The Mode of plowing ought to be varied according to the Nature of the Soil, and the early or late ſowing. And it is a common Saying, Sow early and have Corn, Sow late and have Straw.

There is another common Rule ſaid to be a ſtanding one in Huſbandry, viz. The more Thoroughs the greater the Crops; which may be admitted as far as the Soil is more broke, and made finer by that Means. But if it occaſion the Seeds to fall cloſer to each other, ſo far it diſagrees with the modern Method of ſowing leſs Seed, and at a much greater Diſtance than is uſually done, which is now ſo much preferred to all other Ways.

About Dunstable they plow much in Stitches; and in Essex ſome very good Farmers practiſe this Method with very great Succeſs; making five Stitches when they come to ſow, which five make a Perch, ſo that between every two Stitches ther is a Thorough a Foot wide.

They ſow theſe Stitches length-ways by hand, and a Perſon uſed to it will ſow for two Teams, each

each of which plows an Acre and an half a Day; and when they have done the neceſſary Plowings, they run a ſmall Plow drawn by a ſingle Horſe, along every Thorough, which caſts the fine Mould and Corn each Way on the Stitch, and leaves the Thorough clean.

By this Method, and the ſowing ſparingly, they apprehend they have all the Advantages that are promiſed by the Drill Plow; and the Benefit of their Wheat having ſufficient Room for its Growth, eſpecially as there are ſo great Spaces left at each Side of the Stitches.

PLINY mentions the plowing Ground eleven Times, which is thought very ſtrange; but there are two very good Farmers who have ſeveral Times plowed their Ground as often: and as ſoon as the Ground is cleared from the Corn, conſtantly apply the Plow to it, and repeat it every Fortnight or three Weeks, whilſt the Weather will allow, in order to give the Earth the Benefit of the Sun, Air and Dews; and to extirpate and prevent the Growth of Weeds, which grow beſt at this Time; and by this repeated Huſbandry have cleared their Ground ſo well from Weeds, that I this Year ſaw Fields of Wheat without a Weed in the Sheaves, or one growing in the Field that I could obſerve; and one led his Wheat immediately after it was ſhorn. And by this Method they never have any Smut or blighted Corn, though one of them uſes no ſteeping: and the Land is ſo mellow, that two Horſes and a Man plow an Acre and a half a Day with great Eaſe; ſo that in Reality, they have no more Trouble than thoſe who plow leſs with ſtronger Teams, and a Boy to drive.

How the Wheat is to be prepared for the Ground.

Under this Head there are two Things to be principally regarded:

The firſt is, what Sort of Seed is to be procured; and what Quantity of it is neceſſary.

And next, how that Seed is to be ordered.

As to the firſt, the uſual Allowance for Wheat has been named already; whoever approves of the Drill Way of ſowing, ought to approve of ſowing leſs Seed than is commonly allowed to an Acre; as it comes nearer in Appearance to the Drill Method of Huſbandry, which allows the greater Advantages to the Seed of more Room for the Sun, Air, Dews, and Rain; and greater Compaſs to ſpread their Roots in the Earth, which are the principal Benefits propoſed to be obtained by the Drill Huſbandry, except the ſaving of ſome Seed; which, in this Reſpect, is comparatively of no great Value. But in the common Way of ſowing, ſome Regard is to be had to the Time, ſince a Peck leſs will do in SEPTEMBER than after; and a Peck more than common is required in gravelly, and new broken up Grounds: and certainly great Allowances muſt be made in ſome Places for the Damage done by Vermin, which frequently devour or carry off the Seed, whilſt others are ſpoiled by lying expoſed to the Severity of the Weather.

The ſucceeding Calculations of what Produce may reaſonably be expected from Wheat ſowed at ſeveral Diſtances, may probably give the Reader ſo clear a Notion of this Matter, as to guide him in his Conduct, as to the common or different Method of ſowing his Corn.

But why may not Wheat be hoed at ſuch Diſtances as the Owner pleaſes, as well as Turnips? Is not the ſame Reaſon that ſatisfies us of the Prudence of our Conduct in the one, as ſtrong and forcible in the other? The Farmer before named ſpoke of hoeing his Wheat as well as his Turnips, but has not yet ventured to cut up what I would call the ſuperfluous Wheat; though he finds the hoeing it not only to anſwer as to the clearing off the Weeds, but alſo as to looſening the Surface, and refreſhing the Wheat: but ſure the hoeing Wheat to eight or nine Inches Diſtance, could be no Hazard of making it too thin; and this near the Thoroughs would anſwer the Diſtances propoſed by thoſe who ſeem deſirous to allow the largeſt Compaſs of ten or twelve Inches to ſpread in.

But why might not the ſpare Wheat in one Place be tranſplanted to Vacancies, which frequently happen in others, or even to freſh Ground prepared for it?

A good Hand with a Trowel would tranſplant ſeveral Hundreds in leſs Time, and at a leſs Expence than moſt Readers would imagine; and Wheat may certainly be tranſplanted very well: I name a Trowel becauſe that when it opens the Ground for the Wheat, hardens not the Sides of the Holes as ſetting Sticks do, but leaves the Earth looſer for the Wheat Root to ſtrike freſh in.

Every Farmer knows Wheat will bear cutting down occaſionally, or mowing at proper Seaſons without any Prejudice to it. It is as publickly known that it will bear trampling on by Sheep, when folded properly upon it; and the Roller is frequently alſo uſefully applied to it; and I know it will bear being tranſplanted, and if prudently done at a proper Seaſon, and in Ground ſuitable for it, a Man would preſently tranſplant an Acre at a Foot Diſtance: the Hazard could not be great, and the Profit of its ſucceeding would be very conſiderable. Or the Trial may be made on a leſs Parcel of Land, and on ſuch which the Farmer might not before have had Time to order to his own Satisfaction.

As to the Choice of proper Seed Wheat, there are very few who have that Care in this Particular which they ought to have; for much more certainly depends on good and proper Seed, than moſt Perſons think.

Corn growing on Virgin Mould (as called) or new broken up Ground, is generally allowed to be beſt of all; and where that cannot conveniently be had, it is very adviſeable to get Seed from ſome diſtant Place at leaſt once in two Years; or if from Land in the ſame Neighbourhood, let it be from different Sort of Land.

Mr. YELVERTON who gained the Reward in IRELAND for getting the beſt and moſt Wheat there, had his Seed from ENGLAND; but whereſoever the Seed is taken or brought from, take particular Care that it be perfectly clean and ſweet. And it is generally agreed, that the largeſt and faireſt of the Sort ſhould be choſen for Seed; as uſually producing the moſt, the largeſt, and the beſt Ears of Corn: which Rule

generally holds good both in Grain, Roots, Vegetables, and Trees, as well as in Animals; all which commonly partake pretty much of the Parent Seed.

Another conſiderable Article is the making the Seed perfectly clean from Seeds of Weeds, and Filth of all Sorts, as well as from bad Grains. And in this Caſe a little comparative Pains at firſt, will ſave a great deal of Trouble afterwards, both as to the keeping the Ground ſweet and clear from Weeds, as well as from bad and ſmutty Corn: and this, whether it be ſowed dry, or firſt brined or ſteeped in ſome Compoſition, which is now the moſt uſual Method in managing Seed Wheat, and ſhould in courſe be next conſidered.

Of brining or ſteeping Seed Wheat.

As this relates not only to Seed Wheat, but to many other Sorts of Grain and Vegetables, we ſhall give it a diſtinct Conſideration after we have concluded the Subject of Wheat; and only mention ſome ſingular Receipts recommended particularly for the improving of this Species.

We before mentioned the Compoſition uſed by Mr. Yelverton; and ſhall mention that uſed by Colonel Plummer. But as to the many Compoſitions which have been much cried up, and ſold at a great Price; they have ſeldom given any great Satisfaction, or procured the deſired Succeſs; ſo that we ſhall take no particular Notice of them.

Colonel Plummer *of* Hertfordshire, *Way of ſteeping Wheat.*

Firſt waſh the Wheat through three or four ſeveral Waters, ſtirring it well each Time, and ſkim off the light Grains.

Put Water in a Tub with a Tap, with as much Salt as will make an Egg ſwim; then add as much more; ſtir it very well, and put in two or three Pounds of Allom beat fine, and ſtir it well.

Uſe it as ordinary Brines, only ſteep the Wheat thirty or forty Hours; for leſs ſignifies nothing.

Take the Wheat out the Night before you ſow it, and ſift ſome ſlaked Lime on it. And add freſh Quantities of the Ingredients as wanted.

Mr. Bradley obſerves, That many Farmers ſteep their Wheat in Brine, yet have ſmutty Wheat, becauſe they do not make their Brine ſtrong enough; or take their Wheat out too ſoon.

A late Writer directs to ſteep the Seed in Rain Water, in which Bay Salt is mixed, till it will bear an Egg, for thirty Hours; and after to ſpread it on a Floor, with fine Lime mixed with it, and ſtirred together ſtill each Seed leaves clinging to another, and till it ſeems candy'd with Lime; and then, he ſays, doubt not the Increaſe of your Harveſt.

There are great Variety of other Receipts given to the ſame Purpoſe, and that which Mr. Ellis ſeems to value himſelf much upon, mentions the diſſolving three Pounds of Copperas in two or three Gallons of ſcalding Water, ſtir it till it is diſſolved; and, when juſt warm, pour it over two or three Buſhels of Wheat. A Quarter of an Hour after pour over all the Wheat Seed, as much mudgel-hole Water as will make the whole ſwim four Inches; and ſtirring it ſufficiently, you may ſkim off all the Seeds of Weeds, and the light Corns that occaſion Smut and Pepper Wheat.

The Seed is to lie in this Liquor twelve Hours, or it wanted ſix, or four, or two Hours; then draw all clear off, and lime it directly for ſowing the ſame Morning; but if the Seed lay and drained twelve Hours firſt, it would be better.

Care muſt be taken, that if it be not ſowed ſoon, that it be not left to lie long thick together, which ſeems agreed on all Hands to be prejudicial.

The Reader will find ſome Remarks on theſe Receipts hereafter, when ſteeping in general comes to be conſidered.

Of ſowing Wheat.

This having been treated of before, I ſhall here only give ſome additional Particulars.

The Time for ſowing Wheat in general, is from the Middle of September to the Beginning of December; but ſome Sorts of Wheats, and upon ſome particular Occaſions others may be ſowed at different Seaſons, as was mentioned when the different Sorts of Wheats were deſcribed.

But in general great regard is to be had to the Nature of the Land, and the Weather; for though dry Land may be ſowed with Care in moiſt Weathers (tho' not in wet, if it can well be avoided) yet ſtiff wet Land is only to be ſowed in a favourable Time, for fear of the Seed being loſt by the Ground's binding, or burſt, as it may ſometimes happen: but the laſt may, I think, be avoided with a little Care; as will be mentioned when we come to treat of Steeping.

But it is generally agreed to be much the beſt to ſow the Seed in freſh Mould, and for that Reaſon they commonly ſow as ſoon as ever the Ground is made ready to receive it.

The ſowing the broad Caſt way is very well known; but the ſowing of Wheat by Hand, ſowing or ſpraining the Seed in along the Stitches, as was before mentioned, and as they frequently ſprain in Peaſe, is not ſo common; though this latter Manner ſeems to come the neareſt ſetting in Rows; or ſowing according to the Drill Manner of Huſbandry.

The next Thing to be conſidered is,

How the Wheat and the Ground are to be ordered whilſt they are together.

Now the firſt Care here ſeems to be, to get all the croſs Gutters and Thoroughs well cleanſed, and the looſe Mould and Corn in them caſt upon the plowed Ground; for which Purpoſe a ſmall Plough is uſed in ſeveral Places, which is eaſily drawn by any Horſe, and contrived to throw the looſe Mould and Corn on both Sides, and leave the Thoroughs perfectly clear and ſmooth to let the Water run off.

After this there ſeems three Things neceſſary to be conſidered under this Head:

Firſt, What is to be done when the Wheat

is too forward or rank, which would endanger its being laid and ſpoiled.

Second, What is to be done when it is too poor, and wants ſome Aſſiſtance. And,

Laſtly, The great Article of keeping it clean from Weeds, which is commonly the Effect of bad Huſbandry; and often the natural Conſequence of manuring the Land with mixed Dung full of young Weeds, or with the Seeds of Weeds, which ſoon ſpring and ſpread; and which the Farmer will find it difficult to keep down, and a Work of Years to extirpate. Indeed this is a Calamity the beſt Huſbandmen often ſuffer by; ſince it is evident that the Seeds of Weeds are frequently carried by Winds and by Birds; and often lie concealed for Years in the Soil, and ſprout up on the Ground being plowed deeper than common, or near to the Hedges.

When the Wheat is too rank, it is ſometimes thought proper to mow, ſometimes to eat it, and ſometimes to feed and fold Sheep on it, as the particular Circumſtances require; which laſt is not only an Advantage ſometimes this Way, but alſo for the improving the Ground when it wants, not only by the Dung and Urine of the Sheep, but by the fining of the Mould by their treading it with their little Feet; and the Nouriſhment conveyed by the Warmth of their Bodies lying on the Ground. Which two laſt material Articles ſeem quite overlooked, or at leaſt very little regarded by ſome of our late Writers.

As to the Article of refreſhing the Ground when too poor, by ſome additional Improvement. The folding, when proper, anſwers that End very well; and, in other Caſes, the ſprinkling on a few Buſhels of Soot, Malt, Duſt, Pigeons Dung; or any Thing of that Kind will anſwer the End deſired, or even fine Mould or Dung mellowed; eſpecially if the Wheat be hoed as before mentioned, which alone would anſwer the End of refreſhing the Wheat very much, as well as help to keep down the Weeds; which is the great Difficulty the Farmer has to ſtruggle with, and which I come now to conſider.

Of weeding of Corn.

Weeding the growing Corn carefully in the common Way, by cutting them up, or drawing them where it can be done without Prejudice to the Wheat, helps to make the Ground ſweet and clean, gives the Grain more Room to grow, and to receive the Benefit of the refreſhing Air, the kindly Warmth of the Sun, the fertilizing Dews and Rains. And further, it makes the reaping the Corn eaſier and cheaper, and ſaves a great deal of future Trouble in every Article; from the cutting to the carrying it to the Market, and even in the ſelling it: ſo that it behoves every prudent Farmer to be careful in this Particular.

This is neceſſary to be done, and will be a pretty ſure preſent Remedy, as it will keep down the Weeds, and prevent their running to ſeeding, and filling the Ground with a future Crop. But this is only a temporary Help, and not an effectual Remedy, as not reaching the Root of the Diſtemper, which lies much deeper.

We before mentioned the Benefit of hoeing of Wheat, and this Summer I ſaw the Advantage of it, when performed with a ſmall Hoe, and a ſkilful Hand: for this not only cuts the Weeds, but deſtroys moſt of the Roots, ſo that all Annuals were deſtroyed; and thoſe of a more laſting Nature, prevented from doing any more Miſchief this Seaſon: the Fruit of this hoeing was, I ſaw not one Weed in a whole Field of Wheat this Seaſon, at the Reaping.

But the Reader muſt not expect the ſame Succeſs on one Hoeing, or Weeding; ſince this Farmer had for ſome Years induſtriouſly extirpated all Weeds, and carefully avoided every Thing which he thought could occaſion their Growth; ſuch as the carrying Dung with Weeds in it to the Ground, &c. Notwithſtanding which Care, he frequently obſerved a new Growth of Weeds when he plowed deeper than uſual, or near the Hedges; and thought the ſmall Seeds of Weeds were brought by the Winds and Birds, and often lodged in the Cracks of the Earth, occaſioned by Heat, or in other Places of the ſame Nature.

Theſe Remarks of this ſenſible Farmer are exactly conformable to the Obſervations of the late Mr. Ray, and other ingenious Writers, who obſerve, That many Seeds will grow when kept ſeveral Years, and moſt when kept more than one; and that ſeveral Sorts had been kept fourteen Years, and ſome buried ſo long in the Ground, and yet grew when brought again into the open Air and ſowed.

Theſe Remarks will probably give the Farmer a further Inſight into the Origin of Weeds, than he might before think of; and put him on carrying his Thoughts further, in order to obtain a proper Remedy for the Diſeaſe.

This can be no otherwiſe procured than by conſidering, that there are two Sorts of Weeds, thoſe called Annuals, and thoſe Perennials, or which laſt ſeveral Years.

The Annual Weeds will be pretty eaſily managed, if Care be taken to prevent their ſeeding both in and about the Ground deſigned to be kept cleat from them. And alſo, by watching the Compoſts laid on ſuch Grounds, that they are not full of ſuch Weeds, or with the Seeds of them, which will immediately grow in the Field; and muſt then be deſtroyed there by frequently ſtirring the Ground, and turning them to the Heat of the Sun, or Severity of Froſts, or other Ways extirpating them before they ſeed, whenever they appear.

Formerly it was cuſtomary to throw up Gravel Walks in Winter, in order to deſtroy Weeds, but the doing it in the Heat of Summer is now found more effectual: and there is the ſame Reaſon for, and will be the ſame Benefit in plowing, or ſtirring up Lands, in order to deſtroy Weeds in the greateſt Heats, which will generally deſtroy both Seed and Root.

I preſume, the ſo frequently ſtirring and turning the numerous Compoſts now to be met with on every Road, is not only to mix them well together, but to prevent the Growth of Weeds in them.

As to the Perennial, or laſting Weeds, the ſame Methods will in a great Meaſure procure

the ſame preſent Advantage; but as they will grow again, and many of them will ſpread how oft ſoever they are cut down. There is no effectual Remedy, but the extirpating them by eradicating by a common Dock Spade, uſed for drawing up Docks, or deſtroying them by expoſing them to the Heat of the Sun, or Severity of the Cold, the former of which is the moſt effectual; or elſe by harrowing them off on plowing, and then burning them, as I lately ſaw practiſed near CHELSEA, with twitch Graſs.

In ſome particular Caſes other Remedies may be applied, for I have known Salt Brine in CHESHIRE poured on Walks to deſtroy Weeds, and am aſſured ſcalding Water will take the ſame Effect.

Where Salt Water is near it may be properly applied for this Purpoſe, eſpecially for deſtroying of Weeds on Dunghills or Compoſts, but Care muſt be taken not to apply too much, for fear of the over-ſalting it, and preventing the Growth of the Corn or Graſs for ſome time; a proper Proportion of which I cannot aſcertain, though I have ſome Experiments now depending for that Purpoſe; but think the Farmer may very ſafely pour an Hogſhead of Sea Water, or more, on every ſuch Quantity of Manure he deſigns for an Acre of Land, which I preſume will help to kill the Weeds on the Dung or Compoſt, and alſo enrich the Ground when it is ſpread with the Manure.

We before mentioned the Advantage of uſing ſuch Manures as Marle, Chalk, Lime, &c. in reſpect to this Article of Weeds, as not conveying any of them to the Ground; and alſo touched on the Benefit of the artificial Graſſes and Turnips, on Account of their giving the Farmer an Opportunity of laying his Dung on the Ground, and at the ſame time either preventing the Growth of the Weeds which might be in them, or giving him a very good Opportunity of deſtroying them before the Time Corn comes to be ſowed on that Land, by the uſual Courſe of the new Huſbandry.

Where the Corn is ſowed in Drills at a proper Diſtance, it will not be difficult to clean it from Weeds by the hoeing Inſtruments; but great Care muſt be taken, that the Weeds are toſs'd, or laid ſo that they grow not again, which they will be very ſubject to do, if they are trod on when cut, or not laid light on the Ground, free from Soil adhering to them.

How the Wheat is to be managed when ſeparated from the Ground.

Here it will be proper to mention the different Methods of managing the Corn whilſt in the Field, uſed by the North and South Country Farmers, with their reſpective Reaſons for their reſpective Conduct.

In the North Counties, at the Evening, they generally ſet up about eight Sheaves, cloſe in two Rows, and then cover them with two large Sheaves half opened, and drawn over the Tops of the others, which ſhelter the whole like a thatched Cover, and will protect all for ten or twelve Days or longer, againſt all uſual Weather; and in Caſe of exceſſive Rains the wet Sides of the two Covers will ſuffer, but very rarely any other; and it muſt be a continued long Series of very ill Weather, if the Farmer has not an Opportunity of houſing his Corn well.

In the South they ſet up twelve or twenty Sheaves in two Rows, without any Cover, which they ſay helps to whiten the Wheat, but if any violent Rain or Wet happen, all their Corn ſuffers extreamly.

Where the Corn is very dry and clean, I have ſeen it carried away as ſhorn; but the more uſual Method in both Parts of the Kingdom, is to let it ſtand ſome time in the Field to ſweeten it, and make it whiter, and to ripen any Part which wants a little Weather, and alſo to kill any Graſs or Weeds which may be yet amongſt the Corn, and which may be prejudicial to it when in the Barn.

But however different the Sentiments of the Farmers may be, in the Particular above-mentioned, all good ones agree, that it is wrong to houſe the Corn too ſoon; and better to err rather in the other Extreme, it being almoſt a Proverb, "It is better to ſpoil Corn in the Field than in "the Barn."

The next Thing is the mowing it cloſe in the Barn, or ſetting it on a Stack out of Doors; in both which Caſes it is difficult to guard againſt Vermin, though ſome are very dextrous in what they call Mowing the Mouſe out of the Barn: but the ſetting it on Poſts, or Stones capped with others, which reach over the firſt on every Side, is generally found the beſt, and then Corn may ſtand ſeveral Years ſweet and good. And in ſome Parts of STAFFORDSHIRE, and ſome other Places, they make their Stacks round, a Circle being the moſt capacious of all Figures, and the moſt ſecure againſt boiſterous Storms and Winds, breaking the Force of them gradually; whereas the ſquare ones receive the full Force of the Wind and Wet, and all the Inconveniencies attending them.

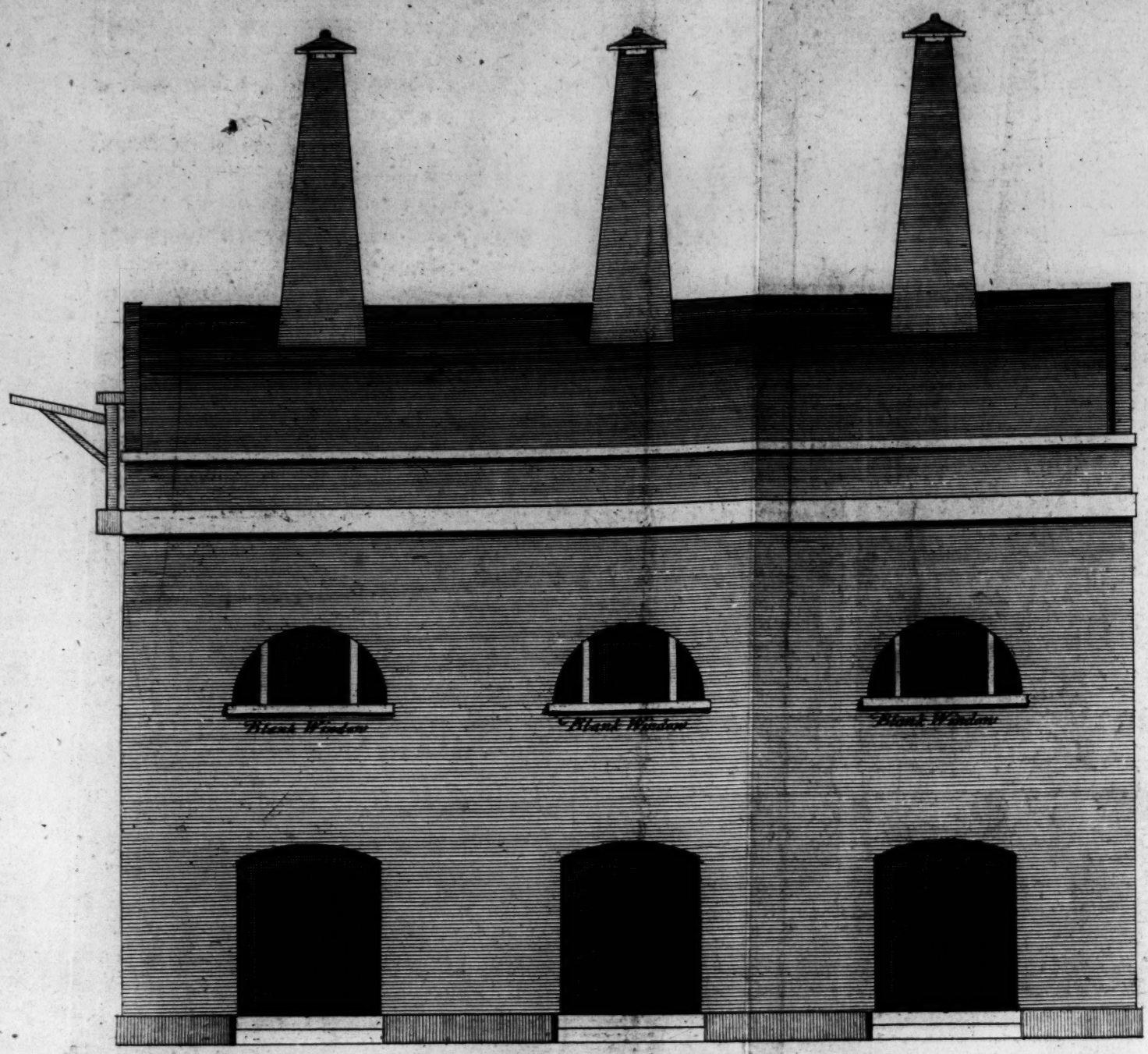
But however careful the Farmer may be, Mice will ſometimes get into his Stock by one Stratagem or other, and are frequently carried in the Sheaves out of the Field, and are ſoon of very ill Conſequence. It may be known if they are there, by thruſting an Aſh Pole, or Poles, pretty far into the Stack, which the Mice will eat the Bark of if they be there, as may be ſeen when they are drawn out again; for it is well known that Mice will eat the Bark of the Branches of ſeveral Trees, and the tenderer the Bark the greater the Temptation, and the eaſier it is done.

The immediate thatching, or otherwiſe ſecureing the Stacks till thatched, is certainly very expedient; and often delayed in Harveſt to the conſiderable Prejudice of the Farmer, which might be eaſily, in a great Meaſure, prevented at a little Expence, by moveable Covers, as was formerly mentioned.

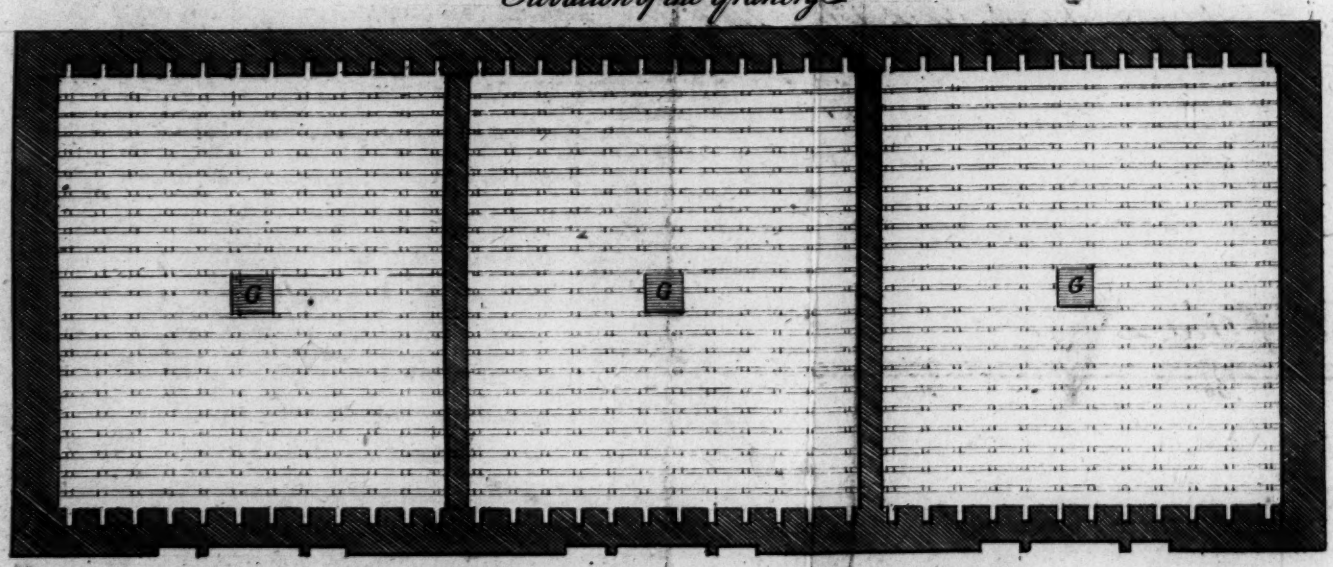
The Price of thatching, where Labourers have One and Six-pence per Day for doing the whole, is uſually Ten-pence for an hundred ſquare Foot.

Threſhing is the next Thing to be conſidered, which is generally performed the beſt and eaſieſt in warm dry Weather, or in Froſt; for notwithſtanding the Barns are kept as cloſe as poſſible, the Grain is found to quit the Huſk the beſt in

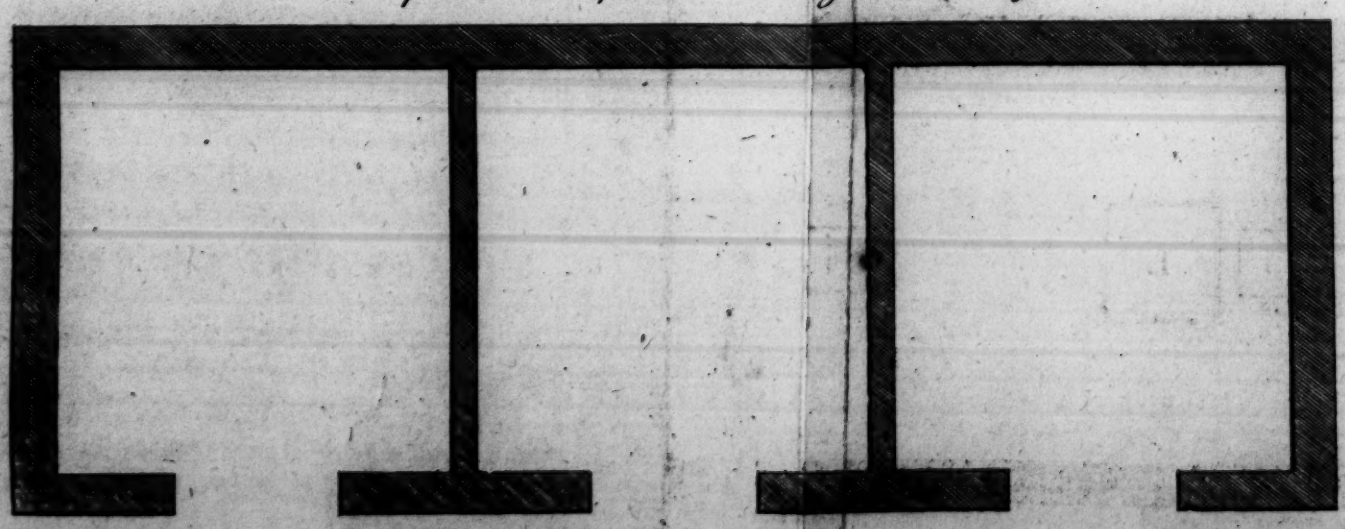
A Ventilating GRANARY for th



Elevation of the Granery



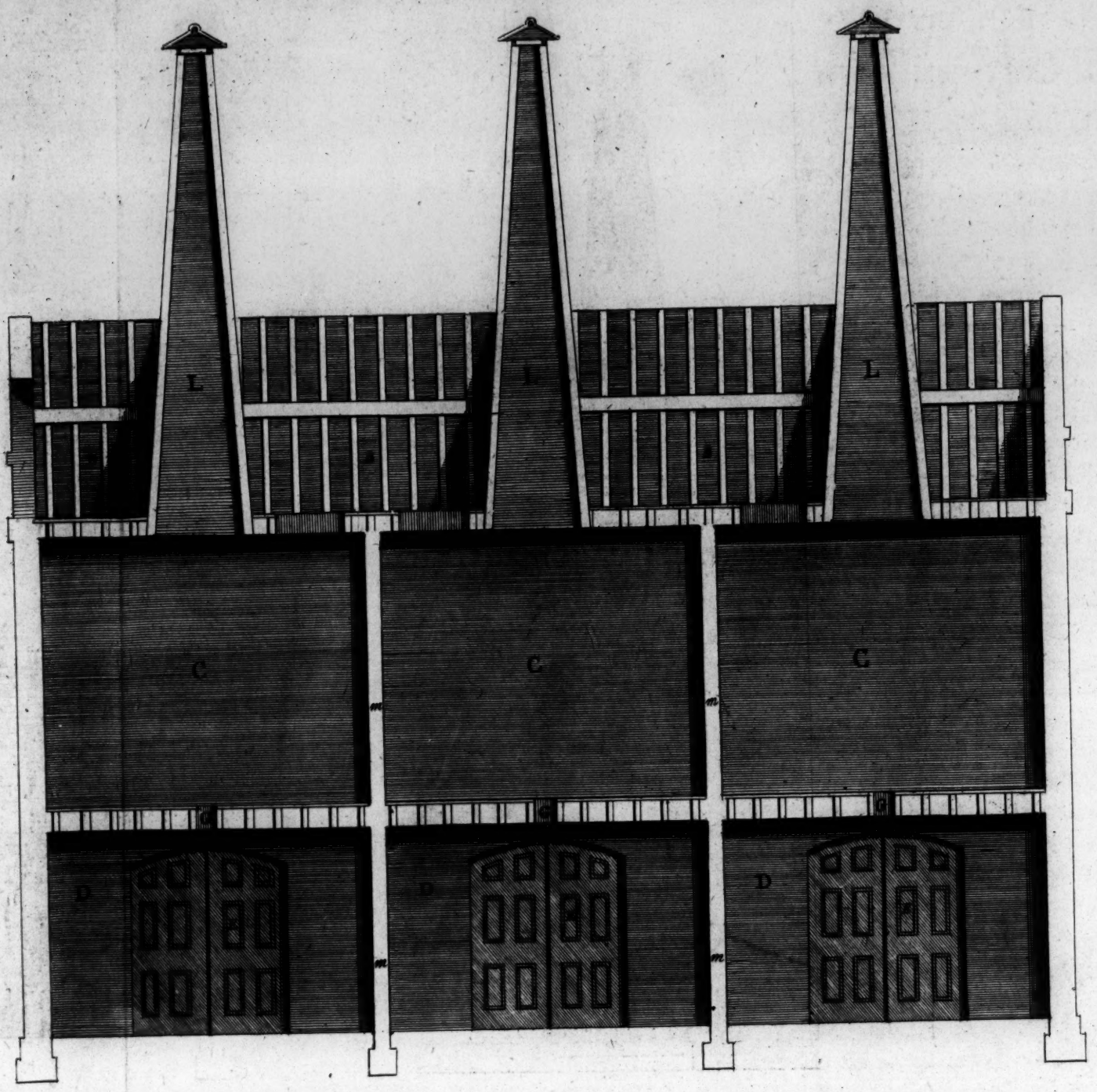
Plan of the Chamber floor where the Grain is to Lay



Plan of the low floor

Engraved for the Compleat Body of Husbandry Pub

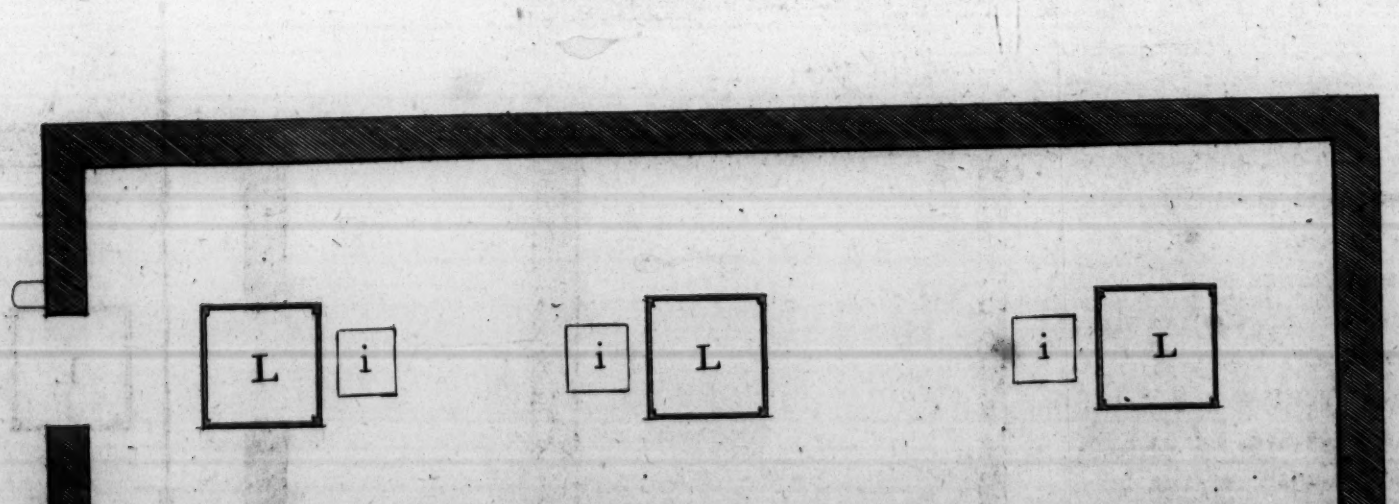
for the preſervation of CORN in a ſtate of Reſt.



Section of the Granery Length ways through the Middle

A Scale of Feet

10 9 8 7 6 5 4 3 2 1 5 10 15 20 25 30 35



Plan of the Garret floor

J. Mynde ſc.

ndry Published by the King's Authority in Weekly Numbers at 6.d each.

thoſe Seaſons, which ſhews what Influence the Weather has, even in this Caſe, where it would not be expected to occaſion any ſenſible Alteration.

The common Price for threſhing, cleaning, and putting Wheat into the Sacks, is two Shillings per Quarter, where the Labourer's Wages are Fourteen-pence per Day at that Seaſon, and muſt be proportionably leſs where Wages are leſs. But good or bad Corn makes a Difference as to the Work, and will have its Influence on the Wages. And ſo will the Quantity of Grain in the Ears, ſome having above Forty, ſome about Thirty, and ſo on; and here Care muſt be taken, that the Corn be not damaged, when threſhed by lying on a damp Floor too long, before it is cleaned or carried off.

There is a wide Difference even in the Article of cleaning Corn between the South and North Country Farmers; the former cleaning it by caſting in the Barn, from one End of it to the other, the beſt flying fartheſt, and then ſeparateing and cleaning it again after, by the Wheat Ridler, or Fans; whereas the North Country Farmers perform this by Wind, which generally does it very well, and in defect of that have a Fan with Sails, turning on an Axis, which does the Buſineſs effectually; and even is allowed the Preference by Mr. ELLIS, notwithſtanding his Partiality for the HERTFORDSHIRE Farmers. But to do the South Country Method Juſtice, a Man and a Boy will clean more than five and twenty Buſhels in a Day, as that Author mentions, ſo that he miſtakes in this Point.

The next Thing to be done is to ſend the Corn to the Market, if the Price be agreeable, or to keep it in hopes of a better, the former Method muſt in general be taken; but where any Perſon is of Ability, and has an Opportunity of keeping Corn when it is cheap, by this he has a fair Proſpect of promoting his own private Intereſt; Corn generally bearing double the Price if any one Crop miſcarries, which it generally does once in four or five Years. It is well known that the DUTCH have frequently bought our Corn, and ſold it again to us at double the Price, to the great Diſadvantage of the Nation, by not ſaving it themſelves.

So that, in Reality, he who ſaves Corn in plentiful Years, may be called a publick Benefactor, as really promoting the publick Good. For it has often been lamented, by wiſe and good Men, that we have no Publick Granaries, to ſupply us in a Time of Scarcity: which all wiſe Nations, and good Governors ſhould take particular Care of.

The Countries moſt famous for abounding in Corn, were THRACE, SARDINIA, SICILY, EGYPT, and AFRICA.

When AUGUSTUS had reduced EGYPT to a Roman Province, he took peculiar Care of the Bed and Canals of the NILE, which by Degrees had been much clogged with Mud, through the Neglect of the Kings of EGYPT, and cauſed them to be cleaned by the Roman Troops whom he left there. From thence came regularly every Year, twenty Millions of Buſhels of Wheat. Without this Supply the Capital of the World was in danger of periſhing by Famine.

When the Emperor SEVERUS died, there was Corn in the publick Magazines for ſeven Years, expending daily ſeventy-five Thouſand Buſhels, that is to ſay, Bread for ſix hundred thouſand Men.

What a Proviſion was this againſt the Dearth of any future Years!

CONSTANTINOPLE was ſupplied in the ſame wiſe Manner as ROME was, when the Empire was fixed there; and an admirable Order was obſerved in both thoſe Cities, for the Subſiſtence of the immenſe Number of Inhabitants.

The Emperor CONSTANTINE cauſed almoſt fourſcore thouſand Buſhels of Corn, which came from ALEXANDRIA, to be diſtributed daily at CONSTANTINOPLE: this was for the Subſiſtence of ſix hundred and forty thouſand Men; the Roman Buſhel ſerving only eight Men.

To give a later Inſtance of the Effect of Magazines of Corn, after the fatal Battle to the FRENCH at BLENHEIM, the FRENCH Generals waited on the King, with an Intent to get his Directions how to recruit their Forces, none of them venturing to name the great Diſtreſs they were in. The King aſked if his publick Magazines for his Soldiers were full, and being anſwered in the Affirmative, he ordered them to take particular Care that they were kept ſo. And ſoon after they found the Effects of that Proviſion, for there being a Scarcity in general, and good Proviſions made for the Soldiers, the Army was effectually ſupplied with Soldiers without any Compulſion.

Theſe Inſtances will both convince us of the Wiſdom of keeping of Corn, and alſo that it is poſſible to do it for many Years, which is next to be conſidered.

Of the Methods of keeping of Corn.

There are various Methods of preſerving Corn, which may be conſidered either as they relate to publick Granaries or Magazines, or as they concern and are the Property of private Perſons; and as there is at preſent no Appointment of the former with us, I ſhall only juſt mention two or three Particulars about them; and then come to what is within the Compaſs of private Perſons, and what may be of Advantage to thoſe who are deſirous to promote their own and the publick Good at the ſame Time.

VARRO aſſures us that Corn would keep good for fifty Years, when ſhut up cloſe in the Ear in ſubterranean Caverns, which they covered on all Sides with Straw, to defend it againſt Damps, cloſing the Entrance with great Care, to prevent the Air from getting in.

This Method of preſerving Corn in the Ear is ſtill practiſed, when Corn is to be ſent to far diſtant Places. And it is ſent after this Manner to AMERICA, in Caſks perfectly well ſtopt up, otherwiſe the Subſtance will evaporate, and the Plantation of it prove ineffectual.

Another Method is to clean and dry it well, and remove it once in fifteen or ſixteen Days, for half a Year; and if it is laid up dry it will need little more Care.

After two Years good Preſervation it may be kept forty, fifty, or a hundred Years, by lodging it in Pits which are covered with ſtrong Planks well joined

joined together, or which is a more ſecure Method, by covering the Surface of the Heap with a ſmall Quantity of Quick-lime, and then diſſolving it again by ſprinkling ſome Water upon it with Prudence and Precaution. This Quick-lime will cauſe the Grain to ſhoot two or three Fingers in Depth, and form a Surface or Incruſtation, which is too ſtrong to be penetrated either by the Air, or any rapacious Inſects whatſoever.

In ſome Cities Abroad they have proper Receptacles for preſerving Corn in the Town Walls, particularly at Leghorn, which being cloſe ſtopped, kill all Weaſles, and keep the Corn good.

There are ſeveral other Methods preſcribed for preſerving large Quantities of Corn; but as there is no Probability of reducing them into practice here, it will be no Advantage to repeat them. But the Reader, no doubt, will obſerve that the ſame Methods directed for the keeping of large Quantities, may be made uſe of to preſerve leſs.

But as to preſerving ſmall Quantities for four or five Years, which, in general, is long enough for private Perſons in this our Country; the keeping Corn in a Stack ſet upon wooden Poſts or Stones, with Caps over them to prevent Mice getting into them, have been frequently found abundantly ſufficient to anſwer both the propoſed Ends; the preſerving the Corn good, and the bringing in great Profit to the Owner.

And if it ſhould be found convenient to take away that Stack, and place another on the ſame Poſts whilſt Corn continued cheap, there would be no Loſs any more than the diſpoſing of the Stack yearly.

And as to the Objection of the Farmer's wanting the Straw for his Ground, and the Chaff for his Horſes, as mentioned by a late Syſtem Writer; theſe are Conſiderations too trifling to be ſet in Compariſon with the Advantages propoſed by the keeping of Corn, eſpecially in Corn Countries, in which the Straw is little valued in plentiful Years, and the Chaff often entirely diſregarded.

It is common with many Farmers to keep a deal of Corn ſafe in Bags, and a great Quantity may be ſecured ſo in Hair Bags in a little Compaſs, and placed ſo that Cats may alſo keep the Place clean, if kept in common Sacks.

About Hempsted they put five Buſhels in a Sack, which is above three hundred Weight, which ſtrong Fellows are hired to carry up into the Repoſitories; though the Cuſtom is a very bad one, and often attended with very prejudicial Conſequences to thoſe who carry them, as has been the Caſe of ſome I know.

Where full Sacks are uſed in Rooms or Granaries, I have obſerved a very commodious little Machine uſed for conveying them from Place to Place, by which I have ſeen near twenty Quarters of Corn delivered out with great Eaſe in a very few Minutes. And as it is very uſeful in this Particular, and may be eaſily improved for ſeveral other Uſes, I ſhall deſcribe it hereafter.

Some place their Wheat, when threſhed, in the Chaff, in the Midſt of a Stack of Corn in which it will lie in a comparative little Compaſs.

But the moſt effectual Method is to have a Granary raiſed on Poſts, or Stones capped, as before deſcribed, for Corn Stacks: which, if contrived as the Malt-houſes are, with ſeveral Floors, the Corn may be eaſily removed, when neceſſary, from one to another, readily downward; and, by proper Pullies, with no great Difficulty, to the higheſt; and, by ſuch Removals, kept perfectly clean and ſweet as long as deſired.

Whatever Method is taken to preſerve Corn, the Place where it is kept ought to be free from Damps and all Moiſture, as well as from ill Smells of all Sorts; all which ſoon give a Tincture to the Grain, and make it muſty, ill-ſcented, or ill-taſted.

Few who have made any Obſervations in Life, but know how ſoon good or ill Smells are communicated from one Body to another, when placed near together, of which we ſhall ſpeak more at large when we treat of Steeping and Brining. That Coffee gives a Tincture to Tea, when near it, is very well known, and what we are ſenſible of. And the Faculties of many of theſe diminutive Creatures, are much finer than ours, and therefore ſeveral Herbs and Compoſitions may keep them from touching Corn: ſome Things being immediate Death to ſome of them, which we ſcarce perceive. Good dry Wheat ought to be placed in a clean ſweet Place for keeping, and it will not be right dry for the Purpoſe till after March, according to the Opinion of the beſt Judges.

The Reader will obſerve, that the Subſtance of all the Methods for preſerving of Corn is much the ſame, to wit, To have what is good, ſweet and dry at firſt; and to keep it from Air, Wet, and Vermin after.

As to Vermin, the waſhing the Walls and Floors with bitter Herbs and Drugs, with Leaves of Wormwood, Vinegar, Beaſts Galls, &c. is very ſerviceable, and where there are uſed Weaſles or Worms will ſeldom bite; and the Aſhes of green Oak are ſaid to be the killing of Mites when ſpread on the Floor.

We before mentioned the Power of Lime ſlaked in this Reſpect; and Brimſtone ſeems to have an Effect beyond every Thing of this Kind. It is well known that when a little of it is taken inwardly, it will communicate a Smell through the Body to the Cloaths the Perſon has on; and, if applied outwardly, will colour Money in the Pocket. Dr. Hale has ſeveral curious Remarks relating to it, which, with ſome other Obſervations, and a few other Things of the ſame Nature will be mentioned under the Head of Steeping and Brining of Seeds and Grain. And therefore we ſhall proceed to the laſt Thing propoſed to be conſidered, under the Article of Wheat, which is,

A Calculation of what Seed Wheat is required when ſowed at different Diſtances; and of what Produce may be reaſonably expected from each different reſpective Method.

An Acre of Ground contains four Thouſand eight Hundred and odd ſquare Yards; and in the

the following Calculations, I ſhall compute it by even Numbers; that is, by five Thouſand Yards to be ſowed; and making Allowances for Thoroughs, Headlands, and other Accidents, ſhall reckon four Thouſand Yards to produce Corn, we ſpeak here only of the common old Methods of Huſbandry.

Now an Ounce of Wheat may be computed by an even Number, to contain ſix Hundred Grains; and there being ſixteen Ounces in a Pound, there will be nine Thouſand ſix Hundred Grains in a Pound: and there being about ſixteen Pounds commonly in a Peck of Wheat, there will be one Hundred fifty-three Thouſand ſix Hundred Grains in a Peck of Wheat, reckoning a Buſhel of Wheat at ſixty-four Pounds.

An Acre of Wheat ſet at twelve Inches Diſtance, allowing Seed for five Thouſand Yards, for the Reaſon before mentioned, will take forty five Thouſand Grains, not quite five Pounds, or the twelfth Part of a Buſhel.

But when the Grain is ſet at eight Inches Diſtance, it requires double the Number of Seed: that is, eighteen a Yard, being ninety Thouſand Grains, not near a Peck of Wheat.

When the Corn is ſet at ſix Inches Diſtance, there will be thirty-ſix Grains in a Yard, and one Hundred and eighty Thouſand Grains in an Acre, as computed above.

And when the Grain is ſet at four Inches Diſtance, there will be eighty-one in a Yard; and, in the whole Acre, four Hundred and five Thouſand, not three Pecks of Wheat. And reckoning one Hundred fifty-three Thouſand Grains to a Peck of Wheat; and ten Pecks of Wheat, which is the common Allowance of Seed to an Acre, as we uſually ſow the Ground, there will be one Million five Hundred thirty-ſix Thouſand Grains of Corn to an Acre; and ſo there will be near four Grains ſowed on every ſquare of four Inches; that is, almoſt a Grain to every two Inches ſquare, or four cubic Inches.

The uſual Product of Wheat when reckoned pretty good, is commonly about five Quarters, which is ſixteen Times the Seed that is generally ſowed, which is a better Produce than they had formerly in many Places. We are informed by CICERO and PLINY, that ten for one was the higheſt Produce of an Acre, but the ordinary Produce was eight, with which the Huſbandman was well content.

The Ears of Wheat uſually contain from about thirty to above forty Grains each, and taking forty as the middle Produce (which will be high enough) and allowing twelve Stems to each Grain of the Corn ſet at a Foot Diſtance, which is as much as they will bear without the Benefit of Horſehoeing: and reckoning four Thouſand Yards (as above ſtated) to produce Corn, then each Stem producing four Hundred and eighty Grains, there will be in the whole thirty ſix Thouſand Times four Hundred and eighty; which in the whole will be ſeventeen Millions two Hundred and eighty Thouſand. And there being ſix Hundred fourteen Thouſand four Hundred Grains in a Buſhel, there will not be forty Buſhels in an Acre ſo ſet at a Foot Diſtance, with the ſuppoſed Produce of twelve Stems to each Grain, and forty Grains to each Ear.

When the Grain is ſet at eight Inches Diſtance, there will be double the Quantity ſowed; that is, eighteen Grains in each Yard, and eight Stems to each Grain of Seed, the Number of Seeds will be ſeventy-two Thouſand; which, being multiplied by three Hundred and twenty Grains ariſing from eight Stems, the Produce will be twenty-two Millions and forty Thouſand, which is about a fourth Part more than what was ſuppoſed to be produced from the Seed ſown at a Foot Diſtance, this being ſomewhat above ſix Quarters to an Acre.

When the Grain is ſowed at ſix Inches Diſtance, with an Allowance of ſix Stems to grow from each Grain, there will be one Hundred and eighty Thouſand Grains of Seed; that is, thirty-ſix Times five Thouſand.

And it being preſumed there will be four Thouſand Yards that will bring Corn, and that each Yard has thirty-ſix Grains of Seed ſowed on it, and that each Stem has forty Grains; that is, two Hundred and forty Times thirty-ſix, multiplied by four Thouſand, makes thirty-four Millions five Hundred and ſixty Grains of Corn, which is a third more than aroſe from ſowing at eight Inches Diſtance; and, conſequently, above nine Quarters to an Acre.

When the Grain is ſet at four Inches Diſtance, and four Stems allowed to ariſe from each Grain for four Thouſand Yards; there will be eighty-one Times four Thouſand Seeds to be reckoned to produce Corn; and then there will be in the whole three Hundred and twenty-four Thouſand Seeds, which being multiplied by one Hundred and ſixty Times, each ariſing from one Corn with four Stems, and each Stem ſuppoſed to bear forty Corns; the whole will make fifty-five Millions eighty-four Thouſand, which will be near a third Part more than thoſe ſet at ſix Inches Diſtance are ſuppoſed to produce; and three Times as much as thoſe produce which were ſet at a Foot Diſtance, and would be near twelve Quarters, which have been frequently obtained in the common Way of ſowing.

If we ſhould go into the Conſideration of Grain when ſowed cloſer together than four Inches, we ſhall come into that Uncertainty of the Diſtance which falls to the Share of each Grain in the uſual Methods of ſowing. All theſe Calculations ſuppoſe the common Method of Huſbandry to be uſed; we have ſhewn before the Quantity procured by Corn ſet at a Diſtance and horſehoed.

The Reader will not think that theſe Calculations are to be depended on as exactly true, ſince they are only made in order to give him a general View of what may reaſonably be expected from ſetting Corn at ſeveral Diſtances; and, perhaps, may be found in general as near the Truth as can be expected in an Affair of this uncertain Nature; in which the Writings and Practice of others have been of little Service to direct me; but which I have endeavoured to collect from ſome Rules in Huſbandry pretty well eſtabliſhed, and from ſome Rules of Pro-

portion; which, in many Caſes, ſerve as very good Guides to argue from; and which, I hope, will be of ſome Service to the Reader.

And if theſe Calculations be tolerably well founded, then the ſowing Wheat in Stitches by hand, as before mentioned, at four, five, or ſix Inches Diſtance in the Rows, and in the ſame Proportion in other Caſes, may perhaps conſidering the unavoidable Loſs of many Seeds, and Vacancies of many Places in all Fields, be as good a Rule to go by, as any can be given in general: for, whatever may be ſaid of the great Extent of ſome Roots of Wheat in Depth and Breadth, four or five Inches either way will be a good Allowance: unleſs we take into our Conſideration the Obſervations of Dr. HALE, of the great Depths ſome Plants receive Nouriſhment from, which they certainly may have the Benefit of conveyed to, or obtained for them, by the Heat of the Sun and Air above, or Warmth of the Earth below; which we ſhall have Occaſion to conſider more at large hereafter.

There is one Advantage that may ariſe from tranſplanting of Wheat, which may not improperly be added to what was before ſaid on that Head; which is, That by this Means the Farmer may have an Opportunity of giving his Land to which the Corn is to be brought, the Advantage of more Plowing, and lying to ſweeten; and alſo the Benefit of the Winter Froſts and Snows, which all good Farmers know to be exceedingly advantageous to their Land: and what the ingenious Dr. BEAL ſays on this Subject, cannot but make a deep Impreſſion as to the Benefit which may accrue by this.

"I do often, ſays the Doctor, aſk Gardeners "and ſkilful Huſbandmen whether all Sorts of "Land are more fertilized, or more ſpeedily by "the ſolar Influence in our Climate, or by "Froſt; and they generally anſwer, That Froſt "and Snow make the quickeſt Diſpatch a-"mongſt us, and the more general and richer "for Fertility*. And ſuch a tranſplanting of Wheat, may, in all Probability, be often a great Advantage to the Wheat itſelf; for whenever that is too rank, it muſt be eaten or mowed down, or will be ſpoiled. But ſuch a Removal of it will give a proper Check to its Growth, without any Prejudice to the Wheat. And the taking up of young Trees when they are too vigorous, and ſetting them down again immediately in the ſame Place, is practiſed by Gardeners, and adviſed by ſome very good Writers for the very ſame Reaſon, that the removing the Wheat when too rank is propoſed, That is to give an eaſy Check to its too forward Growth.

* *Philoſ. Tranſact.* vol. II. p. 731.

Of brining or ſteeping Corn or other Seeds.

We ſhall firſt mention the Advantages propoſed by this Practice; and then conſider the ſeveral Ways of ordering it beſt.

From the brining or ſteeping of Seed Wheat, or other Seeds, the following Advantages are propoſed to be obtained:

Firſt, That it will certainly make the Seed to grow, and come up pretty much together; and, conſequently, have the faireſt Proſpect of being ripe together.

Now theſe often happen otherwiſe when the Seed is not ſteeped, as part of it may fall where it may be brought to ſprout ſoon, and part lie long in the Ground before it does ſprout; and in caſe a long dry Seaſon follows ſuch ſowing, ſome Seeds, as Barley, and ſeveral others, may not come up at all, or in ſuch a Manner as quite to ſpoil the Crop.

The ſecond Advantage propoſed by this Method, or ordering the Seed, is the ſecuring it againſt Birds, and Vermin devouring it, and its being ſpoiled by Smut. And,

Laſtly, That the Seeds ſteeped in proper Ingredients imbibe a fertilizing Richneſs from the prepared Liquor; or by the Lime uſually caſt on it, and adhering to it, at the Time of the ſowing it.

Now, That both Salt and Lime, which are the Ingredients moſt commonly uſed on this Occaſion, when properly applied, are very great Fertilizers of Land for the producing of Corn, is too plain to need any Proof: the known Uſe and Advantage reaped by them, puts this beyond all doubt; and that they are equally deſtructive of Vermin, is alſo found by the conſtant Experience of all concerned with Salt and Lime.

And all Houſewifes know how effectually Salt preſerves all Manner of Proviſion from the taint by Vermin; and it was before truly obſerved, that the very Smoke of a Lime-kiln effectually clears all who engage in it, from all Manner of Vermin they were before afflicted with; and I have ſeen Caterpillars drop from Gooſeberry Trees, under which a little Lime was ſlaked for a Trial.

The only Queſtion therefore ſeems to be, Whether ſuch imbibing of the Brine, or other Liquor, the Seed is ſteeped in; or the Lime ſo adhering to the Seed, ſhall be a ſufficient future Security of it againſt Vermin and Smut, and be a Fertilizer of it in its Growth.

Now we have undoubted Proofs of the long continued Effects both in Smells and Taſtes ariſing from a very ſhort Application of one Body to another; which we may reaſonably preſume to be the Caſe of Brines, Soots, Copperas, and particularly of Brimſtone, and other Ingredients of the ſame Nature; and the general Uſe of one or other of theſe by moſt Farmers, ſeems to confirm the Advantages reaped by them.

Good and bad Crops are undoubtedly got both with ſteeping and without, the Advice ſome give to keep the Ground clean and ſweet, to till it well, is certainly very good, and ought to be purſued by every ſenſible Farmer, whether he ſteeps his Seed or omits it.

Many are ſtrenuous againſt ſowing the uſual Quantity of Seed, and favour the Drill Huſbandry; but if little Seed be ſown, and nothing done to ſecure that little againſt voracious Birds, and deſtructive Vermin, I doubt they would ſoon make ſuch Devaſtation, as would leave many Vacancies free from any Corn at all.

There is an Objection I have heard made againſt ſteeping, which is, That when Corn is

brined and ſowed in a dry Seaſon, the brined Seed frequently grows mouldy and decays when not covered. But the Steeping, if done right, will ſet it on ſprouting, and it will then ſtruggle hard to live: and it certainly is in as great Danger of being devoured when not ſteeped, by lying open, as of growing mouldy by being brined. But the uſual Quantity of Corn ſowed will abundantly ſupply ſuch little Accidents: and this very Objection ſeems to ſhew, that the Steeping preſerves it from Vermin, when it is ſuffered to lie uncovered without being carried off by Birds, or devoured by Inſects.

No one ſeems to deny, that a regular Steeping will certainly produce the ſprouting of the Seed, and all the Conſequences of it, which is the firſt Advantage propoſed by it.

This Advantage cannot be hoped for, unleſs it be ſteeped in a proper Manner; for throwing a little Urine or Salt Water over the Seed is ſo far from obtaining this firſt End propoſed, that it will rather produce the direct contrary Effect, by occaſioning thoſe Grains which happen to be brined, to vegetate ſooner than the others which are not brined.

Whereas it muſt be a regular Brining of the whole that can produce a regular Vegetation of all, which is the firſt Advantage propoſed. And it is undoubtedly on this Account, that in all ſenſible Receipts for Brining, an induſtrious and repeated ſtirring of the Seeds in the ſteeping Liquor, is ſo earneſtly and ſo conſtantly preſſed.

And here I cannot but obſerve, that the firſt Waſhing, or repeating Waſhings of the Seed in fair Water, directed in ſome of the Receipts, ſeems to me prejudicial to the End propoſed by ſteeping it. For as the Seed can imbibe but a certain Quantity of Liquid, if it ſuck firſt a Quantity of fair Water, it cannot after retain ſo great a Quantity of the ſteeping Liquor it would otherwiſe do; and probably this might make it neceſſary for Colonel Plummer and others to make their Brines ſo extravagantly ſtrong, when as good an Effect would have been found by a much weaker Brine, applied in the firſt Inſtance, or from whatever other Liquor the Grain was to be ſteeped in.

And as to the clearing of Seeds, light Corn, and ſuch Trumpery: as Salt Water is ſpecifically heavier than freſh Water, that Refuſe would riſe better on the Brine when the Seed was well ſtirred than in fair Water; and, conſequently, be the eaſier and more effectually ſkimmed off.

And here it may not be amiſs to take Notice of a Remark or Objection made by a very ingenious living Writer, to Seeds, in regard to the Danger many of them will run of burſting, if ſowed in a wet Time, or if a wet Seaſon ſoon follow; which Danger or Difficulty, or whatever you pleaſe to call it, may, I think, when neceſſary, be eaſily and ſafely guarded againſt, by enuring them gradually to gentle Degrees of Moiſture, according to their Nature; and then committing them, and the Soil they were moiſtened in, to the open Earth, which I have tried ſucceſsfully in ſeveral Inſtances. And if we once knew what Degree of Moiſture any Grain or Seed will bear at firſt, without receiving of Prejudice, it can be no great Difficulty to uſe them in the Manner they are able to bear at firſt; and then commit them to the open Air, which they muſt be ſometimes hazarded in, whatever Method is taken in the Management of them. And, I preſume, all thoſe Seeds muſt be forwarded by ſome ſtrong working Preparative, before they are committed to the Ground, when the Gardeners can raiſe a Sallad during the Roaſting of a Joint of Meat, or in a very few Hours.

But to return to Brining.

It ſeems very plain from conſtant Experience, from the Reaſon of the Thing, and the Nature of ſeveral Receipts for Brining and Steeping before-mentioned, that many Sorts of Seeds may be made certainly to grow, and that equally as to their Time of ſprouting by Brining or Steeping, which was the firſt Advantage propoſed to be obtained by Brining or Steeping of Seeds and Grains. And the next Thing to be conſidered is, the

Second Advantage propoſed by Brining or Steeping Seed or Grain, which is, The ſecuring it againſt Birds or Vermin devouring it, or its being ſpoiled by what is called Smut.

The ſteeping of Seeds was well known in Virgil's Time, and that with Ingredients, in order to ſecure it againſt deſtructive Vermin long ſince. For Sir Hugh Plat in his Garden of Eden*, mentions Lime beaten to Powder, and mixed with Corn before it be ſowed, to prevent Rooks and other Fowls from devouring it, and puts a Queſtion, if it does not alſo help to enrich. And in another Place he mentions, the laying Peaſe in Water a Day or two before they are ſown, and puts a Queſt. of ſteeping in Milk, Spirit of Wine, or Water that hath been long infuſed on Dung, waſte Soap Aſhes, or common Aſhes, whoſe Heart and Salt hath not been drawn out before. And mentions ſome Experiments to procure the Growth of Seeds in a few Hours.†

* Page 61, 62.

† Part II. p. 20.

What is above-mentioned as then thought practicable, has for ſome Years been found, by repeated Experience, to be right: and moſt Farmers now uſe one Sort of Brine or Steeping Compoſition or other for ſeveral Sorts of Grain: and, we may preſume, that ſo general a Practice, and the Advantages procured by it, when properly managed, will ſufficiently juſtify the Proceeding in the ſame Courſe of Huſbandry; for I do not find it objected to, that Vermin, notwithſtanding the Steeping, ſtill devour the Corn, which happened to a Field of the ſenſible Farmer before ſpoke of; who told me, That the Blades of his Wheat (unſteeped) turning yellow, and dying away; on examining into the Ground, he found all the Grain gone.

But as the Methods of Steepings and Brinings are exceeding numerous, and very various, it is next to an Impoſſibility to chuſe out ſuch as will fit all the different Sorts of Grains and Soils; but they all do, or ſhould point at the ſame End. To wit, To convey ſomething to the Grain or Seed diſagreeable or deſtructive to Vermin and Birds; and which at the ſame Time may fertilize or enrich them. We will conſider

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the former as it falls under this preſent ſecond Head. And the latter, when we come to the following third Head: and then conclude with ſome ſuch Obſervations which may ariſe from the Whole.

In order to do that Juſtice to ſteeping which it deſerves, we ſhall conſider,

Firſt, The Reaſonableneſs of ſuch a Procedure; or the Grounds we have to believe that Steeping or Brining will ſecure the Grain when ſowed.

Then thoſe Conſequences which repeated Experience hath taught us generally to ariſe from ſuch Steepings and Brinings.

Now it is not to be doubted but that moſt Creatures have a Senſe of what is agreeable or diſagreeable to them, and avoid the latter as far as is in their Power, as is plain when Soot is laid round Vegetables; which, whilſt freſh, keeps off Vermin from them.

Again, it is equally evident that ſeveral Compoſitions, or ſingle Things, are fatal to one or more Species of Creatures, which affect not others at all; or ſo little as not to give them any conſiderable Uneaſineſs.

Thus Lime when ſlaked, Salt, Smoak, and Brimſtone, are Death to many ſmall Inſects.

Thus the Oil of Turpentine, or Smoak of Tobacco, will kill Moths; and, at the ſame Time very little affect us, or many other Creatures. And the rubbing of Hangings and Furniture with Sheeps Wool before it has loſt its natural Fatneſs, will ſtop the Progreſs of Moths; but do not occaſion any Manner of Uneaſineſs to thoſe who live or lodge in them, any farther than the Smell of the Wool may be diſagreeable to ſome.

But as the Sheep's Wool has this Effect in this Caſe, may it not be reaſonably concluded, that it will operate much ſtronger againſt Vermin when the Sheep lies on them in the Fold. It is commonly known that the folding of Sheep helps to deſtroy Slugs and Worms in the Land, and there is the ſame Reaſon to expect the Effect in one Caſe as in the other. And this well deſerves the Obſervation of the Curious, it never having been taken Notice of that I know of.

Again, the Faculties of theſe diminutive Creatures are certainly much finer than ours, both as to their Smelling, and their being affected by Scents; of which ſeveral Inſtances might be given of little Creatures. But the curious Smell which Dogs have, and which all Sportſmen, and moſt other Perſons are well acquainted with, would appear very ſurprizing were it not ſo commonly known.

Fumes of Brimſtone will make Leaves wither, though at ſo great a Diſtance from them, as to occaſion it by the Heat of it; and to Animals are moſt deadly.

'Tis thus the Fumes of this Brimſtone may be uſed as an excellent Remedy to deſtroy Vermin; and it preſerves Corn and Bread when packed up to go Abroad.

The ingenious Dr. Hales ſays, he is told that it is by ſome ſuch Methods as theſe, that all the Rats in Ships are deſtroyed when in the Harbour. And he farther obſerves, That the Fumes of burning Brimſtone, placed under Corn, will aſcend through it with great Velocity and Acrimony.

But if it be placed over it, it deſcends not, for Ants in a Muſlin Rag at the Bottom of ſuch fumed Corn, were not killed by it. Which Obſervation ſhews that learned Gentleman's Thoughts of Brimſtone in deſtroying little Animals; and, indeed, the ſurprizing Effects of Brimſtone are ſcarce credible by thoſe who are unacquainted with it; and we have Reaſon to think much greater Effects will be diſcovered from it hereafter. But whoever engage in Experiments about it, had need to uſe great Care in what they do, there having been ſo many fatal Accidents occaſioned by it.

I ſhall only add on this Head, the ſurprizeing Effects of the Liquor uſed by the Bug-killer at the Houſe of a Friend of mine. The Houſe was long terribly peſter'd with Bugs, and the Bug-killer took down all the Beds and Furniture, and waſhed them and the Bed-poſts, &c, and the Walls of the Rooms with his Liquor, and then replaced them, and it is now above three Years ſince; and from that Time there has not been a Bug ſeen in the Houſe. Nor was the Operation attended with any ill Smell, or other ſenſible Inconvenience to any of the Inhabitants, the Dogs or Cats. Nor did the Ingredients ſtain any Thing, or prejudice the Frames of Pictures.

We cannot but obſerve that here was a viſible immediate deſtroying of the Bugs; and a laſting preventing of their return again for ſeveral Years already paſt; and, in all Probability, (as the Man promiſed) for many more yet to come.

This Effect muſt certainly be owing to the Power of the Liquid then uſed, ſtill remaining, and keeping off the Bugs either by its Smell, Taſte, or other deſtroying Power which the Bugs perceive; but are no Way felt by any other living Creature in the Houſe, as far as we know.

And why may not ſomething of the ſame Nature be contrived to be proper, ſafe, and effectual Securities for the ſeveral Grains and Seeds both in the Fields and the Gardens, till they are tolerably well armed againſt theſe great little Enemies, and their greater ones too.

I know ſeveral Farmers who put Arſenick into their Brine for Wheat, and apprehend it very beneficial; but this is a deteſtable Practice: and what is more ſurprizing, we are aſſured, that the Caſſada Plant unprepared, poiſoneth; but, prepared, is the very Bread of the West Indies.

What is offered above, may, in a great Meaſure, convince us what Conſequences may ariſe from proper Steeping and Brining, which frequently are the preſerving the Grain and Seed from being devoured, when ſowed, by either deſtroying the pernicious Vermin themſelves, or giving the Seeds ſuch a Tincture or Cruſt, as will prevent their eating them: as it is well known the Caſe is when Soot, Lime, or other bitter Things are applied to, or about the Grain

or Seed, which conſtantly remain untouched, whilſt the Soot, and ſo on, conſerve their bitter Quality.

And indeed all the Things commonly uſed alone, or in Compoſitions for brining or ſteeping Grain and Seeds; ſuch as Salt, Lime, Soot, Copperas, Nitre, Flour of Brimſtone, Dunghill Water, Bay Salt, Urine, &c. are generally ſuppoſed to have a Power to deſtroy thoſe Species of Animals ſo pernicious to Seeds, or at leaſt to preſerve the Grain from being devoured by them; or elſe to be endued with ſuch a fertiliſing Quality, as to forward the Sprouting and Growth of the Grain and Seed: and moſt of them certainly have one or other, or all the laſt-named Qualities. And their Uſe in preventing Smut depends on the ſame Reaſoning and Experience, as muſt appear to the Reader from what is before mentioned, and which will be further confirmed by what we ſhall offer hereafter, ſo we ſhall here come to the third Head, which is,

That the Seeds ſteeped in proper Ingredients imbibe a fertiliſing Richneſs from the prepared Liquor, or from the Lime uſually caſt on it, and adhering to it at the Time of ſowing it.

Now the Truth of this will, in a great Meaſure, appear from the general Courſe of Huſbandry, in applying Manures in order to promote the Vegetation of Grain, Seeds, and Plants; by which ſome particular Advantages are propoſed to be obtained by the Conſent of all Farmers. And therefore it may be taken for an indiſputeable Truth, being founded on Reaſon, and confirmed by conſtant Experience, That the Growth of Seeds is to be forwarded by the Application of proper Manures to them.

And on a little Examination it will be found equally true, that ſome Sorts of Manures promote the Vegetation or Growth of ſome Grain, Seeds, and Plants, much ſooner than others do.

This, I preſume, will ſcarce be diſputed by any Farmer, or indeed any Perſon the leaſt converſant in Affairs of this Nature; however, I will give an Inſtance or two to put the Matter out of doubt. Pigeon's Dung is undoubtedly richer than Cow Dung; and a Load of any feeding on Animals will encreaſe Vegetables much more than a Load of Dung of Cattle fed on Straw. This is ſo plain that there can be no Occaſion to add any thing further about it.

Theſe Truths therefore being eſtabliſhed, it only remains to ſhew, that the ſteeping ſo ſhort a Time as is uſually practiſed in ſteeping of Grain and Seeds, may convey a laſting Benefit to the Growth of the Seed ſo ſteeped.

And that it may do ſo is no novel Notion, but has been the Opinion of very conſiderable Writers.

In the Work of Fructification I think (ſays Sir H. PLAT) that Corn itſelf may be ſo philoſophically prepared, only by Imbibition in the Philoſopher's Aquavitæ, that any barren Ground, ſo as it be in Nature kindly for Corn, ſhall bring forth a rich Crop, without any Matter added to the Ground *. And DIGBY mentions a Plant of Barley all riſing from one Corn, that by ſteeping and watering with Salt Petre diſſolved in Water, brought forth two hundred and forty-nine Stalks, and above eighteen thouſand Grains. And another Gentleman had from three Spires of ſteeped Barley ſixty, ſixty-five, and ſixty-ſeven Stalks apiece from their ſingle Grain and Root, with every one an Ear on, and about forty or ſomewhat more Corns apiece in them †.

* *Garden of Eden*, p. 137.

† *Philoſ. Tranſact.* vol. IV. 2d part, p. 310, &c.

Many other Inſtances of much later Date, to much the ſame Purport, might be added; but the Gardiners raiſing Sallads in a few Hours, and ſeveral Greens in a few Days, of which we have had many indiſputable Proofs, ſeem to prove the Point in Debate beyond all Poſſibility of Contradiction.

For this ſudden Growth of the Plant muſt either be owing to the ſimle unfolding of the infant Seed into a vegetable Plant, or to the Operation of the Compoſition uſed for the Increaſe of it, and if it would grow ſo without the Help of the Compoſition, it would conſtantly do ſo; and therefore we cannot but conclude, that proper Compoſitions applied to Vegetables but for a ſmall Time, may, and do oft convey a very fertiliſing Power toward the Growth of Grains and Plants, and to Trees too.

This Argument ſeems concluſive, That a ſhort ſteeping may convey ſuch a laſting fructifying or fertiliſing Quality, as will be of a continued Service to the Growth of the Plant.

And we find ſeveral Things much more incomprehenſible of laſting Impreſſions made in a very ſhort Time.

We are all ſenſible how ſoon the Touch of a Loadſtone conveys a laſting Impreſſion to the Needle.

We all equally know that a little Bud from a ſtriped Holly, put into a large green Holly, will gradually occaſion the whole green one to become ſtriped, though the Bud dye away.

Many other Inſtances might be offered, particularly of the wonderful Effects of Poiſons, both as to their working at diſtant Periods of Time, from that they were given; and ſome times directly.

And we farther find it appear, from ſeveral Experiments, and it has been evidently proved by Dr. KEIL, that the Growth of a Tree (to which we may add, and of Corn and Plants) very little leſſens the Weight of the Earth in which it grew. Mr. BOYLE had Ground dug up, and Plants only watered with Spring Water; one weighed three Pound, and one fourteen, and the Earth was ſcarce diminiſhed: and HELMONT dried two Hundred Pound of Earth, and planted a Willow in it of five Pound Weight, which he watered with Rain, or diſtilled Water, and covered with a tin Cover; and in five Years the Tree, and all the Leaves it had borne, weighed one Hundred ſixty-nine Pounds three Ounces, and the Earth was diminiſhed but about two Ounces.

I tried the ſame Experiment in order to ſee how much Turnips took of the Ground, but though ſowed in a freſh Soil, and ſet in an open LONDON Garden, they came to no Subſtance worth Notice.

But may we not from theſe, and other Experiments of the great fertiliſing Qualities of the Air and Dews, reaſonably ſuppoſe that the ſteeping Compoſitions help to expand the unfolding

Plant, and make it more readily receive Additions to its Subſtance from the Air, Dews, &c.

However this Operation is performed, there cannot ſurely be any great Doubt of the Truth of the Fact, after what is before-mentioned; to wit, That there are ſingle Things and Compoſitions which forward the Growth of Grain and Plants, by being applied to them, or by the Grain or Seed being ſteeped in them, which is what was to be proved.

The only Thing therefore now remaining to be conſidered, is, whether the Brines or Compoſitions commonly uſed, be proper to obtain the deſired End, or which of them are likely to be of the greateſt Service.

We ſhould here enter into a large Field, were we to mention the many printed and private Receipts which are to be met with about ſteeping Grain and Seeds, and enlarge on their ſeveral Benefits and Diſadvantages; to avoid which we ſhall only add, to thoſe before-mentioned, two or three of the moſt noted ones relating to Seed Wheat, and then conſider a little which of the many Ingredients may be the moſt likely to obtain the deſired End; leaving ſome Receipts relating to other Grain, to be mentioned when we come to treat of thoſe ſeveral Species of Corn reſpectively.

The Copperas Receipt.

Put a Tap and Tap Whips into a Tub, and then put in two or three Buſhels of Wheat.

Then take three Pounds of Copperas (which is of ſmall Value) and put it into two or three Gallons of ſcalding Water, which will preſently diſſolve it with ſtirring.

Let it cool a little, and then put it all (whilſt warm) over the Wheat; a quarter of an Hour after, pour over all as much black Dunghill Water as will make the whole ſwim four or five Inches, by which, and ſtirring it ſufficiently you may ſkim off all the Seeds of Wheat and the light bad Corns.

In this Liquor let the Seed lye twelve Hours, or if you be in Haſte ſix, four, or two. Then draw all clear off, and lime it directly for ſowing the ſame Morning; but if the Seed lay and drained twelve Hours before liming, it would be rather better.

The Liquor left may ſerve toward ſteeping more, with an Addition of a Pound or two of Copperas.

The ſteeping uſed by ſeveral Middlesex *Farmers.*

At Night put a Quantity of Water in a Tub, with a Tap, then put in five Buſhels of Seed Wheat for two Acres of Ground, ſtir it well and ſkim off the Seeds of Weeds, and of all light Corn; then draw off the Water and take out the Corn.

Then put more Water into the Tub, and a Pint of Salt, and a Pottle of Stone Lime, which with good ſtirring will ſoon diſſolve, then put the Wheat in again, and ſtir the Wheat, the Lime, in the Liquor very well together, and let them lie ſo till Morning.

Then draw off the watery Part, and lay the Wheat on an Heap on the Floor to drain dry, which it will ſoon do, ready to be ſowed.

If you find the Kernels have not Lime enough about them you may ſift on more; but they have, this Way, generally enough lodged on them; the ſkimming of the Seeds is not here named but neceſſary.

Another Receipt.

Throw Bay Salt into Rain Water till it will bear an Egg; in this Liquor ſteep the Seed thirty Hours, leſs will not do.

When you take it out ſpread it on a ſmooth Floor, ſcattering upon it good Store of the fine Ground Powder of ſlaked Lime; ſweep it up and down, and mingle it with the Corn, till every Grain leave clinging to another, and become as it were candy'd with Lime, then ſow it.

The ſame Gentleman who fumed Malt with Brimſtone, as before-mentioned, alſo fumed whole Malt in the ſame Manner very ſtrongly; and being then ground and brewed, it gave no Taſte to Beer that he could perceive; and he ſuppoſed the Effect of burning it would be, that it might prevent the Beer's working too faſt; for this is well known to be the Effect of ſuch Fumes on Wine and Cyder.

He alſo thus fumed Sea Biſcuit, Peaſe, and Wheat, in a large Veſſel, which was repeated again after ten Days, yet they had not much ill Taſte. And expoſing them for ſome time to the open Air would probably free them from the very little Taſte it gives.

He ſowed the Peaſe which grew, ſo that the vegetative Quality of them was not ſpoiled. But the vegetative Quality of the Wheat was thereby wholly deſtroyed; for none of it grew, though ſown three ſeveral Times at ſome Weeks diſtance; and he adds, it would not therefore be adviſeable to fume Corn thus which is intended to be ſown.

In the Philoſophical Tranſactions the following Experiments are mentioned.

On the twenty-ſecond of March, 1699. a Gentleman laid to ſteep a Barley Corn and a Wheat Corn in Brimſtone Water.

A Pea, a Wheat, a Barley, and an Oat Corn in Allum Water; and the ſame in an old Diſſolution of Salt of Tartar; in the Caput Mortuum of Sal Armoniac, diſſolved in Urine; in a Diſſolution of the Salt of Walls; in a Diſſolution of Salt Petre; in a Diſſolution of Noſtoc, or Star Gelly.

He ſteeped them thus five Days and five Nights, and ſet them in a Garden in a good Soil, againſt a North Wall, full in the Sun, on the twenty-ſeventh of the ſame Month, after a rainy Night, with a Pea, a Wheat, a Barley, and an Oat Corn unſteeped.

On the Tenth of April following, he found that ſome were juſt come up, ſome were not.

The Pea, the Barley, and the Wheat ſteeped in Brimſtone came all up together.

The Pea ſteeped in Allum Water was very big and ſwelled, but not ſo much as ſprouted; but the Barley, Wheat, and Oat above Ground.

The Pea ſteeped in the old Solution of Salt of Tartar was half come up, the Wheat ſcarce ſprouted, but the Barley and Oat quite up.

The Pea, the Wheat, the Barley, and the Oat ſteeped in the Caput Mortuum of Sal Armoniac, diſ-

diſſolved in Urine, were all up together; as were alſo the next Row, that were ſteeped in the Solution of Salt of Walls.

The Pea and Wheat ſteeped in the Diſſolution of Salt Petre were about half up, but the Barley and Oat quite up.

Thoſe which were ſteeped in Noſtoc, were none of them come up, nor ſcarce ſprouted.

The Barley and Oat ſteeped in Urine were come up, but the Pea and Wheat ſcarce ſprouted.

And to his Surprize the Pea, Wheat, Barley, and Oat, that were not at all ſteeped, were all of them as ſoon up as any of the former except the Wheat, which was about half up.

They were all ſet about a Finger deep in the Ground, and there was all the Time of their Growth very fine Weather.

From all which he ſuppoſes, that Allum Water is againſt the Nature of Peaſe, and retards their Growth, but agrees well enough with Wheat, Barley, and Oats.

That the Solution of the Salt of Tartar is not friendly to the Nature either of Peaſe or Wheat, but agreeable to the Nature of Oats and Barley.

That the Water of Salt Petre had not any of the great Power or Virtue that he ſuſpected.

And that theſe Steepings did not further any of the ſaid Grains in their Growth and coming, but plainly retarded ſome or moſt of them. He then digged them all up but three Spires of Barley, the Produce of which was mentioned before, and ſome other Particulars relating to them will be mentioned under the Head of Barley.

In all theſe laſt Experiments the Seeds were ſteeped five Days and Nights, which is much longer than any other Steepings practiſed that I know of.

I rather wonder that any of them came up at all, than that ſome of them miſcarried; for ſeveral Seeds will do well when ſteeped a few Hours, or a Day or two, according to their Nature, and the Strength of the Liquid, which yet would be ſpoiled by being ſteeped longer.

However, we may reaſonably conclude, that thoſe which came up when ſteeped ſo long would, in all Probability, have ſucceeded much better had they been laid leſs Time in the reſpective Liquids: and therefore we may reaſonably hope for Succeſs, by prudently trying ſome of theſe Mixtures, or varying them.

The Urine, as mentioned, ſeems tolerably ſucceſsful, but in ſeveral Trials others and I have made, it has deſtroyed the vegetative Power of Wheat, and ſeveral other Seeds, in leſs than five Days. But there may be a Difference as to the Strength of Urine according to different Diet.

Much the ſame may be ſaid about the fumeing with Brimſtone, before mentioned, to be twice repeated, and then attended with ill Succeſs. As to the Vegetation of the Wheat, which probably might have grown, if it had been ſowed after once fuming; and I am the more induced to believe this, becauſe we find, in the laſt-mentioned Experiments, that all the Grains which were ſteeped five Days in Brimſtone Water came up together.

And as Brimſtone ſeems, from its piercing Qualities, ſtrong and laſting Smell, and frequent violent Effects, to promiſe fair for being very uſeful in this Particular, as it is found to preſerve Bread and Corn; the Curious would do extreamly well, to make proper Trials of it in different Ways and Manners; which may be done at a very trifling Expence: but in doing of this the Nature of Brimſtone requires they ſhould be very careful, for the Reaſons formerly mentioned, of the dangerous Effects of it.

In ſeveral Trials I made, I kept the Seeds twelve, four and twenty, and thirty-ſix Hours in the ſame Liquid, and ſowed them ſeverally, at the Times taken out of it; and I have found generally, that Wheat, Turnips, Coleſeed, and many others, will grow freely after being ſo ſteeped in Sea Water, freſh Water, or in freſh Water ſalted equally to the Degree Salt Water is; which is made ſo by diſſolving an Ounce of common Salt in a Quart of common Water, there being an Ounce of Salt in two Pounds of Sea Water; as ſeveral others as well as I have found on repeated Trials.

In the laſt-mentioned Experiments the Gentleman ſeems ſurpriſed, that the unſteeped Grains ſhould come up near as ſoon as thoſe which were ſteeped; but that is nothing extraordinary, conſidering that he ſowed them after a rainy Night. For I have ſeveral Times obſerved, that the ſteeping a Day or two before ſowing, in moiſt Weather, is no great Advantage as to the forwarding the ſprouting of the Grain: the Reaſon of which I take to be, that the fair Water being finer, the Seed imbibes it quicker than that made thick by the Mixture of ſuch Ingredients as are commonly uſed on theſe Occaſions.

And perhaps that long ſteeping the Seeds which he uſed, might occaſion the ſtopping of the Paſſages of the Grain in its ſprouting. It is hard to ſay, with any tolerable Certainty, which Steepings and Brinings are the beſt, for the ſeveral reſpective Grains and Seeds they are commonly applied to; and to aſcertain them in a very exact Manner, the Nature of the Soil, the Seaſon of the Year, the Species and Kind of Grains and Seeds, the ſeveral Sorts and different Quantities of the Ingredients to be uſed, and the Length of Time they are to be applied, ought to be carefully conſidered and allowed for. In all which we ſeem at preſent very deficient, and to labour under very great Uncertainties about them.

Even in the common ſteeping of Wheat in Sea Water, or in Water in which Salt is diſſolved, and the Time the Seed is to lye in it, there is nothing certain yet agreed on; for ſome think the Saltneſs of Sea Water ſufficient, others would have their Brine ſtrong enough to make an Egg ſwim, which is much ſtronger than the former; and others adviſe to put as much more Salt again as would make an Egg ſwim.

And there is as great Uncertainty as to the Time of the Seed lying in the Brine, various Directions being given about it, ſome naming four Hours for the beſt Time, ſome forty, and others different Hours between thoſe two; not to mention that great Variety of Ingredients commonly mixed with or without Brine, and how they operate jointly or ſeperately, uſed ſeverally by

by different Perſons; to omit the different Management of the Seed after it is taken out of the Liquid.

I conceive, they are very much miſtaken, who imagine the liming it to be only to make it ſow better, which ſeveral other Things eaſier to be had would do full as well; but I apprehend both the Lime and the Salt adhere to the Seed, and not only guard it by their Taſte and Sharpneſs, as long as their Virtues remain, but alſo communicate ſome of theſe their Properties to the growing Plant, and alſo occaſion ſuch a Ferment in the Earth as helps the Plant to proper Juices for its Nouriſhment.

Lime may very well acquire Heat enough from a Lime-Kiln, to operate a few Days; and the well known Qualities both of Lime and Salt, are to deſtroy Vermin, and promote the Growth of Wheat.

So that as far as we can rely on our Reaſoning in theſe Caſes, or truſt to our Experience, Lime and Salt may be ſafely and plentifully uſed in ſteeping and brining of Wheat.

It is very probable that by a few careful Experiments, made at different Times, and in different Ways, this Manner of brining, &c. may be brought to a reaſonable and very uſeful Certainty, as to the general Practice. And perhaps the Wheat itſelf may be found, when rightly ordered, to imbibe ſuch Quantities only of each Ingredient, as will beſt anſwer the Ends deſired; and at the ſame Time refuſe ſuch Overplus, or ſuch Kinds of Juices as may be found prejudicial to it.

It will certainly be proper to avoid uſing Ingredients alone which are too ſtrong for Wheat, ſuch as Urine, when not qualified with ſome other Ingredient; and not to keep the Seed ſo long in any Compoſition, as may rob or deprive it of its vegetative Quality. This may be eaſily guarded againſt, by trying any Compoſition the Reader is inclined to uſe, or to form from the ſeveral Compoſitions and Ingredients herein before-mentioned in ſmall Quantities, which he may eaſily make ſtronger or weak; and ſteep the Grain in them longer or ſhorter, and ſow it for Trials, all which may be done with a little Care, at a trifling Expence, and then he may adhere to what he finds beſt to anſwer his Purpoſe.

I am not ſenſible that I have named any one Receipt or Ingredient as uſed in the brining or ſteeping of Wheat, but what may be ſafely uſed, without pointing out one way or other the Danger or Inconvenience which may ariſe from it.

And though moſt of them are very much applauded, yet I have taken the Liberty to touch on ſome Things, which I apprehend may be altered in them, or where they may probably be applied in a more efficacious Manner.

I have alſo named ſome Steepings I have tried, and what may be relied on from them; and as I have ſeveral others now depending, I ſhall be glad to meet with ſuch Succeſs, as to make the publiſhing of them, toward the Concluſion of this Undertaking, of ſome Uſe to the Publick. And if other curious Perſons would communicate theirs carefully made, it may be preſumed that our united Endeavours will produce what may be of real and laſting Advantage to the Farmer, the Gentleman, our Country, and indeed to all Mankind.

Lime and Salt are undoubtedly excellent Ingredients, and ſo are ſeveral other Things mentioned in ſome of the Receipts for brining abovementioned; and if Brimſtone can be brought to be uſeful in theſe Affairs, either alone or with other Ingredients, both the Smell, the piercing Quality, and great Power in the deſtroying of Vermin, ſeem to promiſe as fair for its being very ſerviceable for the preſerving of the Seeds of Grain and Vegetables, as any one thing whatſoever.

Of BARLEY.

Barley is generally eſteemed the next uſeful Grain to Wheat amongſt us, and conſequently it ought to engage our ſecond Care; how deſervedly it is ſo, we ſhall leave the Reader to judge, when we have conſidered them ſeverally and reſpectively.

On the Succeſs of the Wheat and Barley in the Corn Countries, our Farmers generally depend for the Payment of the principal Part of their Rents, and for the Happineſs of themſelves and Families; the other Grains being expected rather to provide Conveniencies for themſelves, and to maintain their Stock, than to raiſe any great Sums for them; and theſe two Wheat and Barley, are accordingly cultivated with great Care, and commonly at a very great Expence.

Barley hath a thick Spike; the Cup, Huſk, Awn, and Flower, are like thoſe of Wheat or Rye; but the Awns are rough, and the Seed ſwells in the Middle, and for the moſt Part ends in a ſharp Point, to which the Huſks are cloſely united.

The great Uſe of Barley is to make Beer, which, as well as the Method of making it, is very well known.

In ſome Counties they make Bread of it, but it is ſo coarſe and unpleaſant, that few like to eat it, who have ever taſted Bread made of Wheat; nor will many uſe it for this Purpoſe, whilſt Wheat continues ſo cheap in Proportion to Barley, as it has done for ſeveral Years paſt. Wheat Bread, when all Things are conſidered, being now the cheaper of the two.

It is alſo uſeful in the Grain, and when ground into Flour, to be given to the ſeveral Sorts of Cattle, and for the feeding of Fowl.

But it is far more beneficial moſt ways, when made into Malt; for it is then ſo ſweet, and endued with ſo fattening a Quality, that few Things exceed that Way: and the excellent Maſhes then made of it for Horſes, and other Cattle, are very well known. This ſhews the fine Spirit which is originally in this Grain, ſince neither the ſteeping, or the drying it for Malt, can take ſuch a Spirit to it.

The great Uſe made of it by the Diſtillers, abundantly ſhews the Spirit that is in it; though I cannot think with a Reverend Writer, that the Revenue it occaſions is to be reckoned amongſt the good Qualities of the Grain; but muſt rather think our National Taxes a Puniſhment for our National Sins.

There is ſome Difference amongſt our Writers, as to the Names and Sorts of our Barley; RAY mentions three Kinds.

1. Hordeum diſtichum; common Barley.

2. Hordeum diſtichum minus; Sprat Barley, or Battle-door Barley.

3. Hordeum polyſtichon; Winter, or ſquare Barley, or Bear Barley, called in the North, where it is commonly ſowed big.

And he adds, he could not forbear to mention, that LOBELIUS wrote, That the BRITISH Malt Liquors far exceeded all other Northern Liquors of that Kind; of which he was a proper Judge, being a FRENCHMAN, and having travelled in thoſe Countries where Malt Liquors are uſually drank.

The Rev. Mr. LAWRENCE mentions four remarkable Sorts of Barley.

Firſt, The long-ear'd Barley, moſt generally eſteemed, for all Uſes and all Sorts of Land.

Second, The Sprat, or FULHAM Barley, which is beſt for rank Land, becauſe it runs not ſo much into Straw as the common Sort does, and it is thought to yield better.

Third, The Hotſpur, or RATHRIPE Barley, which is the earlieſt ripe of any, being commonly got in, in nine or ten Weeks. Now this is conſequently very uſeful on many Accounts, for that Reaſon, as it may be ſowed later, and will ripen in thoſe Places where the others ſcarce will grow; and it gives the Farmer the Command of ſome Weeks, either before the ſowing it, or after the reaping, which is often of very great Advantage in the Courſe of Huſbandry, eſpecially ſince the Improvements made by Turnips; ſo that he may eat his Turnips longer, or ſow later with this Barley than the other, the Advantages of which will be mentioned, when we come to treat of Turnips. And there are Inſtances where two Crops of this Barley have been got in one Year, from the ſame Land.

Fourth, SCOTCH Barley, which this Author ſays gives the Drink made of it a Taſte generally diſagreeable to Strangers; and it has alſo a purging, raking Quality, of the ſame Nature as Rye, when made into Bread.

MILLER mentions five.

Firſt, The common long-ear'd Barley.

Second, Winter, or Square Barley, or Bear Barley, by ſome called big.

Third, Sprat Barley, or Battle-door Barley, as Mr. RAY.

And theſe, he ſays, are commonly cultivated near LONDON; but unthinkingly, in the very next Page, adds, That the Square Barley, or Big, is chiefly cultivated in the North of ENGLAND, and in SCOTLAND, and is hardier than the other Sorts; but ſeldom ſown in the South of ENGLAND, though it might be cultivated to good Purpoſe, on ſome ſtrong, cold, clayey Land, where the other Kinds do not thrive ſo well. But ſuch Slips as this muſt be expected, and allowed for in ſuch an Undertaking.

The other two Sorts cultivated in ENGLAND, are,

Fourth, The RATHRIPE Barley, before-mentioned. And,

Fifth, The naked Barley, which makes tolerable good Bread, very good Malt, and yields great Increaſe.

Having, under the Head of Wheat, conſidered the curious Fabrick of that Grain, and the Manner of the Growth of it; that may, in a great Meaſure, be applied to the other white Corns: and therefore I ſhall offer no more of that Kind here.

The principal Uſes of Barley, and ſeveral of the peculiar Qualities of the different Sorts of it being before-mentioned, we ſhall not repeat it; but only obſerve in general, that all theſe ſeveral Sorts of Barley are to be ſowed in a dry Seaſon, and at different Times, according to the Nature of the Soils they are to be ſowed in, and the Sort of Barley you ſow them with. And it may, in general, be ſowed from the Beginning of FEBRUARY, but rather in MARCH and APRIL; and the RATHRIPE will bear ſowing in the Beginning of MAY, and do very well, eſpecially if properly ſteeped.

Barley has the ſhalloweſt Roots of all the white Corns, and yet ſtands firm notwithſtanding it has a very tender Footing.

It will not grow in many Soils where Wheat will; a loamy ſtiff Earth is not proper for it, unleſs it be brought into an exceeding fine Tilth, which it requires, and alſo as rich a Soil, and as much Culture as any Grain whatſoever.

And as Barley is mentioned to have the ſhalloweſt Root of any of the white Corns, it may not be amiſs to obſerve, that a late ingenious Author thought there were not many Grains or Graſſes which required above three Inches depth of Soil for their Nurture; whereas both Reaſon and Experience prove the contrary, and as I may not have another ſo convenient an Opportunity of conſidering this Point, I will here mention ſome Particulars on the Subject.

It was mentioned, under the Head of Wheat, that Mr. MILLER had traced the Roots of Wheat a Yard deep, and I have traced them a great Way.

From the Experiments made by the curious Doctor HALE (which Dr. DUMAINBRAY, in his Lecture on OCTOBER the 29th, 1755. aſſured us, when they were publiſhed ſurprized all the learned Bodies in EUROPE, and that they examined them and found them right).

From this ingenious Dr. HALE's Calculations of the violent Heats and Evaporations in the Summer Months, and the ſmall Quantity of Dews which then fall, and the little further Supplies which are given to Trees, Corn, and Vegetables, frequently for a long Time together by Rains, conſidering the great Quantity of Moiſture which is daily drawn from, or perſpired by the Trees, &c. The Trees, Corn and Vegetables would be dried quite away were they not ſupplied with Moiſture from ſome other Origin, which he reckons to come from the Moiſture in the Earth two or three Foot deep under the Trees: which, together with the Rains and Dews, ſupplies all the Plants with Moiſture ſufficient to keep them alive; and, in ſuch a Condition, as is proper for their well being in general.

And ſince theſe Experiments have gained ſuch a Cha-

a Character, I doubt not but the Subſtance of thoſe which relate to this Particular, will be agreeable to the Reader; eſpecially as I ſhall only give the Reſult of his ſeveral Calculations, as I have abridged them; ſince they are certainly very curious, and may be uſeful on many Occaſions, as well as in Huſbandry, and will accordingly hereafter be referred to; and to give you the Doctor's own Words as to this Point. "If theſe Experiments and Obſervations "give us any farther Inſight into the Nature of "Plants, they will then doubtleſs be of ſome "Uſe in Agriculture and Gardening, either by "ſerving to rectify ſome miſtaken Notions, or "by helping further to explain the Reaſons of "many Kinds of Culture, which long repeated Experience has found to be good; and, "perhaps, by leading us to make ſome Ad- * P. 360. "vances therein."*

"For, the farther Reſearches we make into "this admirable Scene of Things, the more "Beauty and Harmony we ſee in them; and the "ſtronger and clearer Convictions they give us "of the Being, Power, and Wiſdom of the † *Introd.* "divine Architect."†

The Doctor apprehends that the Growth of Vegetables is promoted by the Motion of their Fluids, as in Animals; and therefore thinks it reaſonable, that in them alſo, by the ſame Method of Inquiry, conſiderable Diſcoveries may in Time be made, there being in many Reſpects, a great Analogy between Plants and Animals.

He alſo examined their ſeveral Perſpirations, and found that a Man perſpires in twenty-four Hours, as Dr. Keill reckons, about thirty-one Ounces; and the Plant, allowing for Evening and Morning, twenty-two Ounces: ſo a Man is to a Flower, as one Hundred and forty-one to one Hundred, in this Particular.

He further found that in one and twenty Days in Summer, there were near ſix and twenty Ounces more Wet evaporated from a circular Area of a Foot in Diameter, than fell in Dews: and therefore juſtly concludes, "That "Plants would then periſh, if they had not "ſome other freſh Supplies, either from Rains, "or from below; finding the Evaporation to be four Times as much as the Dews that fall in the Night: and we know by Experience, that for much longer Time often no Rain falls.

On the whole he reckons about two and twenty Inches of Rain to fall in his Neighbourhood, near Hampton Court, in a Year; which may be reaſonably allowed, conſidering the ſeveral Quantities, which, on the niceſt Calculations, have been computed to fall in ſeveral Places, as computed by Dr. Derham,‖ being the Reſult of many Calculations, as follows:

‖ *Philoſ. Tranſact.* vol. IV. part II. page 82.

"The Proportions therefore which I ſhall "now lay down for the yearly Rain of all "Places, whoſe Rain I have had Information "of, are theſe,

"For Zurich (till further Obſervations are "made) thirty-two Inches and a Half.

"For Piſa, (till further Obſervations) forty-"three Inches and a Quarter.

"For Paris nineteen Inches.

"For Lisle four Inches.

"For Townley in Lancashire, forty-two "Inches and a Half.

"For Upminster, nineteen Inches and a "Quarter; all of English Meaſure."

Dr. Hale further mentions, That Nic. Crequius found that twenty-eight Inches Depth evaporated in a whole Year from Water; and the Evaporation of the Earth is found to water as one thirteenth to one fortieth; about one third.

The Evaporation of the Earth in a Year is 9-15. (ſomething above nine Inches) from which 9-15 Inches, there are to be deducted 3-39 Inches (above three Inches and a Quarter) for circulating daily Dews; and then there remain 5-76 Inches (five Inches and three Quarters.) Which 5-76 Inches deducted from the Quantity of Rain which falls in a Year, there remains at leaſt 16-24 Inches Depth (ſixteen Inches and near a Quarter) to repleniſh the Earth with Moiſture for Vegetation, and to ſupply the Springs and Rivers.

Hence we find that two and twenty Inches of Rain in a Year, is ſufficient for all the Purpoſes of Nature, in ſuch level Countries as this about Teddington near Hampton Court.

But it plainly appears above, that the Evaporation in Summer frequently far exceeds all the Dews and Rains which fall then for a long Time; and, conſequently, the Heat would then deſtroy all Plants, unleſs provided for ſome other Way. *Page

In order therefore to find out what Stores of Moiſture Nature had provided in the Earth, againſt the dry Summer Seaſon. The laſt of July 1724, the Doctor dug up three Cubic Feet of Earth, three Foot deep (and mentions the Soil, &c. of the Place.) And when thoſe ſeveral three Cubic Feet were become ſo dry as not to be fit for Vegetation, on weighing them ſeveral Times, he found the firſt Foot (the higheſt) had loſt ſix Pounds ten Ounces of its one Hundred and four Pounds four Ounces, being the Original Weight. That the ſecond had loſt ten Pounds of its original Weight of one Hundred ſix Pounds ſix Ounces and a Half. And that the third had loſt ſix Pounds ten Ounces of its original Weight of one Hundred eleven Pounds and one third. Which together amount to twenty-five Pounds two Ounces; and the Doctor apprehends this a ſufficient Reſervoir for Plants in general, in dry Summers and dry Times: for ſeveral Plants ſtrike deep into the Earth, the Root of the Sun-flower he made the Experiment with, reached fifteen Inches into the Earth; and, conſequently, would draw Moiſture much deeper in dry Times than the Depth its Roots reached. †Page 14 17.

And it is neceſſary to conſider the Heat of the different Times of the Year, and how far that may affect the Generality of Plants; and what they can bear, before they will be burnt up and deſtroyed.

Now in regard to the Heat Plants can bear, the Doctor obſerves, That they will bear without Prejudice a greater Heat than that when Water is heated to the greateſt Degree, he could bear his Hand in without ſtirring it about; and mentions the following Degrees of Heat at different Times:

"That

" That in July the common Noon-tide Heat " in the Sun is about fifty Degrees.

" That the Heat of the Air in the Shade in " July, is at a Medium thirty-eight Degrees.

" That the May and June Heat is from ſe- " venteen to thirty Degrees, the moſt general " Heat for the Generality of Plants in which " they flouriſh moſt, and make their greateſt " Progreſs in Growth.

" The Autumnal and Vernal Heat may be " reckoned from ten to twenty Degrees: the " Winter Heat from the freezing Point to ten " Degrees."

The Doctor farther obſerves:

" That in July the Heat muſt have a con- " ſiderable Influence at two Foot deep, by " Night as well as by Day.

" That the Dew in a hot Day cannot be of " Benefit to the Roots, but is imbibed into " the Vegetables.

" And that Nature has covered Roots with a " very fine thick Strainer, that nothing ſhall be " admitted into them, but what can readily be " carried off by Perſpiration; Vegetables have- " ing no other Proviſion for diſcharging their " Recrement."* *Page 85.

Since a plentiful Perſpiration is found ſo neceſſary for the Health of a Plant or Tree, it is probable that many of their Diſtempers are owing to a Stoppage of this Perſpiration by inclement Air.

The Perſpiration of Men is often ſtopped to a fatal Degree, by Intemperance, violent Heats; and that of Vegetables by inclement Air, unkindly Soil, or want of a genial Moiſture.

By comparing the Root, and the Plant above Ground, we ſee the Neceſſity of cutting off many Branches from a tranſplanted Tree; for half the Root being cut off, (which is the Caſe of moſt young tranſplanted Trees) it is plain it has but half the Nouriſhment, beſides its being put in a looſe Poſition.

This (as well as Experience) ſtrongly evinces the great Neceſſity of well watering new Plantations; which notwithſtanding what Miller ſays, that nothing being more injurious to them than over watering.† †Page 14. 17.

How the Ground is to be prepared for Barley; and of ſteeping and ſowing it.

Barley (as before mentioned) requires as fine a Tilth, and the Ground to be in as good Heart as any white Corn whatſoever. And accordingly, before Turnips came to be ſo much cultivated, the Ground was generally prepared by a Fallow, a Manuring, and ſeveral Plowings. And the Vale Men who get not Turnips, uſe much of the ſame Huſbandry, or elſe fold it with Sheep, or get twenty Buſhels of Pigeons Dung, and ſpread it on an Acre; when the Barley is ſowed, and harrow it in with it.

But ſince Turnips have prevailed ſo much, they are found generally to prepare the Ground very well for Barley, and now it is commonly ſowed after them; when it is eaſily brought to a fine Filth, and when the Ground is in good Heart, there is no great doubt of a good Crop.

The Care to provide good Seed, and to make it perfectly clean, is ſo generally to be done in all Grain, that it need not be here inſiſted on, only juſt mentioned; and the Change of Seed yearly, or once in two or three Years, is alſo found very advantageous: and in the Caſe of Barley, that from ſandy ſhort Loam is found the beſt for ſtiff Land, and that from ſtiff for ſandy.

In very dry light Soils it may be ſowed early in March, or any Time after; but in ſtiff Soils not till April, and ſometimes not till early in May. But in ſuch late Sowing, if the Seaſon does not prove favourable, you run great Hazard as to the having a good Crop; and may be aſſured it will be a late one, which is generally attended with ill Conſequences, and very often with fatal ones; eſpecially if the Barley be ſowed late, and not ſteeped, and a dry Time follows. In which Caſe, at beſt, the Seed lies long expoſed to Vermin, often comes up unevenly, and ſometimes not at all.

Of Steeping.

Whatever the Seaſon is, a moderate Steeping of Barley, cannot be attended with any conrable Inconveniencies, and may produce many great Advantages; as are mentioned at large under the Head Steeping. And when you ſteep, you may manage it in the ſame Manner as directed for Wheat; and almoſt any of the Steepings mentioned will make it grow; as fair Water will, as is well known by the putting it into the Ciſtern with Water in order to malt it.

The Vale Men ſteep it in Salt and Water in which an Egg will ſwim, twelve Hours; and ſome in Water in which Lime is diſſolved, or ſift dry Lime over it.

The Rath-ripe Barley, as was before mentioned, is ſoon ripe; and, conſequently, there is little Danger in ſowing it late, ſince it frequently is ripe in nine Weeks, from the ſowing and ſeldom exceeds ten. But as the late Sowing muſt probably carry it on to a drier Time, there will be the more Occaſion to ſteep it.

The common Allowance for Seed Barley is from four to two Buſhels, according to the Time of ſowing, the Sort of Grain, and the Nature of the Soil: and taking three Buſhels in the Medium, the Produce being four Quarters, it will be about eleven for one. Whereas if only one half of the three Buſhels grew, and produced but two Stems, that would be ſixty Buſhels, which is twenty Times the Seed; and I have known ſome large Fields to anſwer this Calculation.

A late voluminous Writer applies here the common Saying of, " The more Furrows the " more Corn, which is very inconſiſtent with the Drill Huſbandry, and ſetting the Seeds at a great Diſtance, which he recommends ſo warmly.

Mr. Hamilton in Scotland ſet a Handful of Barley at ſix Inches Diſtance; which, in three Weeks, covered the Surface, and produced ſeven Sheaves; but they being ſtolen, he could not be ſure of the Produce.‖ ‖ *Append.* P 42.

Mr. Miller thinks four Buſhels too much; it being his Opinion, that we generally ſow too much of all Grain. And if the Seed could be inſured againſt Vermin and Accidents, and be certain

certain to grow, it would be no great Difficulty to aſcertain the Quantity.

Many others ſeem of the ſame Opinion in this Particular, that we generally ſow too thick; and this ſeems to concern all, or moſt Sorts of Corn. I made ſeveral Calculations under the Head of Wheat, of what Produce may reaſonably be expected from Grain ſowed at different Diſtances in the common Huſbandry; which may, in a great Meaſure be as applicable to Barley as Wheat; and therefore no more need to be ſaid as to that here; only that the Method there mentioned of ſowing the Furrows by Hand, may probably anſwer as well for Barley as any other Method whatſoever.

The Manner of Plowing has been ſpoke to before, as well as Rolling; the latter of which is frequently abſolutely neceſſary; and, when rightly timed, and prudently managed, is always advantageous. It ſhould be done after the firſt Shower of Rain after the Sowing.

Of weeding and reaping of Barley.

No Corn is generally thought to ſuffer ſo much by Weeds as Barley, and therefore a very particular Care ought to be taken to preſerve it from Weeds, or to clean thoſe out which are got into it. The common Way of weeding Barley is very well known, and ſome Weeds will get into it either by Accidents, or by lying long in the Ground, and being freſh raiſed up, as was before mentioned.

This is uſually done in June, and if the Corn be then thin, a little Pigeons Dung, Malt Duſt, or any Thing of the like Nature will be of great Service to it.

But if the Ground be duly managed, according to the Courſe of the new Huſbandry, the Ground will not be filled with Weeds carried thither with improper Dung, which is often the Caſe. And if the Barley follow Turnips, as it now generally does, the Preparation of the Ground made for the Turnips, and the uſual twice hoeing them; if carefully done, will cut up every riſing Weed. To which, if we add the Turnips after over ſhadowing the whole Ground, and by that Means checking the Growth of any Weeds or Trumpery; all together, muſt keep the Ground pretty clear from them. But if there ſhould ſtill remain any Signs of this Evil, the Farmer may turn up the Soil two or three Times to the Winter Froſts, before there will be Occaſion to ſow his Barley. The Method of managing which to the greateſt Advantage, will be mentioned when we come to treat of Turnips: and ſurely by ſome, or all of theſe Ways and Means, the Barley may be ſufficiently preſerved or cleaned from Weeds; which will be very advantageous not only in the growing Grain, but in the Caſe of Sheering or ſoon Houſing, Loading, Threſhing, and fitting for the Market.

After the well clearing of the Barley from Weeds, we may reaſonably hope for an eaſy and expeditious Way of Reaping, and getting it made ſafe.

Now there is a very wide Difference in the Manner of reaping of Barley, between the Practice of the North Country and the South Country Farmers: the former of which generally ſheer and bind, and ſhock it clean and carefully as they do their Wheat; by which Means it is kept from all thoſe Inconveniencies which frequently happen to it by its lying on the Ground, and being alſo expoſed to all the Inclemencies of Weather.

But as this is a Corn not ſubject to ſhed, and the South Country Farmers principal Concern is, to take effectual Care of their Wheat; they commonly mow it, and a Man will this Way cut two Acres a Day, which is certainly a much quicker Way of diſpatching it, and ſo far done at a much leſs Expence. After this, in ſome Places, they let it lie a Day or two, and then turn it; and after a Day or two more, as the Weather favours, and the Weeds are killed, they gather it in Cocks, as they uſually do Hay, and then load it.

In other Places they let it lie after it is mowed, till they apprehend it is dry enough to load, though it be many Days, and rake it both Ways on Heaps, turning it up a little before they load it. However, in thoſe Places where they meddle not with it till they are juſt ready to load it, they are very nice in laying the Ears on that Part of the Swaſh where the Scythe points out, and is the higheſt; which they apprehend keeps it hollow, and lets the Wind under it to dry it: and they are alſo careful in keeping the Ears even together when they rake it. In ſome Places they have Forks with three large Tines, two under, and one riſing a good deal above it, by which they ſhove the Barley both Ways on an Heap.

A Reverend Author calls theſe laſt Ways, "The lazy and ſlovenly Cuſtom of the South," but I rather attribute it to the want of Hands in the South, where they have much greater Corn Harveſts than thoſe in the North.

The Chelsea and Fulham Farmers, who are thought to excel in the Management of this Grain, will, in a dry Time, ſometimes cock it in a Morning, whilſt the Dew is on it, to give it a little Sweat; and a little Rain on it whilſt it lies in the Swaſh, is thought rather advantageous than prejudicial to it. Some mention their letting it lie abroad as giving it a finer Colour.

Of the Produce and Advantages of Barley.

A late ingenious Writer mentions the common Produce of Barley to be, Two and a Half or three Quarters on an Acre; but that he has ſometimes known four Quarters on an Acre. I preſume, he here ſpeaks of what is got amongſt the middling Farmers, ſince he himſelf mentions much greater Quantities of Barley on an Acre.

Four Quarters in the common Courſe of Huſbandry, is generally reckoned a good Crop; but that allowing for the uſual Trouble and Expence of Fallowing, Dunging, and repeated Plowings, will not anſwer ſo well to the Farmer as is commonly thought; as will appear from the following Calculations: in which I ſhall allow three Quarters and an Half as a common Crop, and value the Barley at two Shillings a Buſhel, which is as high as has been

ſome Years, or as it is likely to be whilſt Wheat continues ſo cheap as it has lately been; Barley being uſually reckoned one half the Value of Wheat.

Now here the whole Produce would be two Pounds ſixteen Shillings, and deducting the Outgoings, that is, Seed three Buſhels, ſix Shillings; the uſual Plowings, Sowing, Harrowing, and Rolling, twelve Shillings; Weeding, Reaping, Threſhing, and Cleaning, the Straw being of little Value, eight Shillings; extraordinary Dung or Dreſſing, one Pound; Rent eight Shillings, in the whole two Pounds fourteen Shillings: ſo that there is very ſmall Profit to the Farmer, above paying him for his Trouble.

The common Profit of the uſual Produce of Beans and Peaſe is much better, as will after appear, and they help to improve the Ground for a Crop of Wheat; whereas it is generally allowed, that Barley impoveriſhes Land very much, and on moderate Computations a Crop of Oats, Clover, or Turnips, will be found to pay the Farmer better.

But by the late Improvements made by the new Huſbandry, a conſiderably greater Profit ariſes from a Barley Crop, taking the Produce to be the ſame; for the Loſs of the Fallow Year (the Rent of which was not reckoned to the Outgoings of Barley, as it might be) is anſwered by a Crop of Turnips, which will pay the Rent and what Manure is neceſſary, and the Huſbandry of them; by which Method much leſs plowing is neceſſary for the Barley; and by this Means, all Things conſidered, one half of the Outgoings in the preparing for Barley is ſaved, which conſequently is ſo much clear Gain to the Farmer.

But there is another very conſiderable Advantage may be ſaid to ariſe from Barley, according to the new Courſe of Huſbandry; which is, That Barley, of all Grains, is the beſt qualified to admit the ſowing of a beneficial Crop of Clover in it. And Clover being the beſt Preparative for a good Crop of Wheat, at an eaſy Expence, and Wheat paying generally much the beſt of all Grain, the producing or promoting ſo excellent a Crop, may reaſonably be allowed as an Advantage ariſing from Clover.

A very ingenious modern Writer indeed thinks the ſowing Clover with Barley, to be no good Practice; and is for ſowing it alone in August, thinking the ſowing it with Clover to be the Loſs of a Year: but in this he is certainly miſtaken, ſince by ſowing the Clover with Barley in the Spring, it plainly gains as much Time as it grows from the Spring when it was ſowed with Barley, till August, when it is ſuppoſed to be ſowed alone, and all is in the ſame Year.

And as to the Goodneſs of the Clover when ſowed with Barley, I have carefully enquired of ſome very ſenſible Farmers, their Opinions as to this Point; and was anſwered that they had as good Crops of Clover when ſowed with Barley, as could well grow: and I have ſeen ſome ſuch myſelf, and particularly one this Summer, at Mr. Wood's, at Brockshall, near Kelvedon in Essex; which being very good, I ſhall here give ſome of the Particulars relating to it.

Laſt Year he laid down a Field of twelve Acres with Clover, and this May, 1755. he turned into it to eat it, twelve Horſes, eleven Cows and a Bull, ten Oxen, eight Heifers, and one Hundred Sheep, and thirty Hogs; and kept them there till about Midſummer, ſix Weeks at leaſt, and then ſaved it for Seed.

I ſaw it finely grown in September, and about the End of that Month, he got from it four and twenty Waggon Loads of good Clover. It may be difficult, at preſent, to compute the Value of all theſe, but it cannot well be reckoned at leſs than Sixty Pounds.

But the Produce of Barley being frequently found much larger than what is above-mentioned, may well deſerve ſome Conſiderations about it.

Miller ſays it is very common to have ten, twelve, or more Stems from one Corn; and that he has counted ſeventy Stalks of Barley from one Root, which was tranſplanted.

In the Experiments mentioned before from the Philoſophical Tranſactions, the three Spires of Barley ſteeped there as before-mentioned and ſet at two Foot diſtance, had ſixty, ſixty-five, and ſixty-ſeven Stalks apiece from their ſingle Grain and Root, with every one an Ear on, and about forty or ſomewhat more Corns apiece in them (which, at forty in an Ear, amounts to ſeven Thouſand ſix Hundred and Eighty Corns from the three Grains; being above two Thouſand five Hundred from each ſingle Grain) this great Succeſs the Author thinks proceeded not ſo much perhaps from the Grain, having been ſteeped in any Liquors, as from the Fertility and Goodneſs of the Soil, and their competent Diſtance one from another.

The ſame Gentleman further obſerved, that new Shoots continually ſtruck up from the Roots; ſo that here, if the invigorating Heat of the Sun had not been cooled and weakened by the Approach of the Winter Seaſon, there would have been continually new ripe Corn, and empty Ears on the ſame Root *.

Now this may afford Matter for many curious Obſervations to be made by the ingenious, who have turned their Thoughts to Affairs of this Nature.

* *Philoſ. Tranſact.* vol. IV. 2d part, p. 310---311.

But to conſider what Miller mentions, and take his loweſt Eſtimate of ten Stems to one Corn, and twenty Corns in a Stem; that on the Suppoſition that only one Buſhel of the Seed Barley grew, would be two Hundred Buſhels for one, or twenty-five Quarters to an Acre; which is a Produce ſcarce to be much expected, however curious the Huſbandry may be: though undoubtedly it may be much improved from what it now commonly is.

For if ſuch great Produce be feaſible, the Want of it muſt ariſe either from the not having good Seed, and the not ordering it well, or from the not giving it Compaſs of Ground enough to grow in; or from the Ground not being properly prepared for it.

The two former may be eaſily remedied, by common Care, with a very little or no additional Expence; and as to the proper Preparation of the Ground, that ſhould be ordered in the beſt Manner, whether you ſow your Corn thick or thin, in the common or in the Drill

Way, or if you ſet it. And ſuch good managing of the Ground can be no great Addition to what every good Farmer lays out in preparing his Ground for Barley, a Crown extraordinary would go a great Way, either in providing any ſteeping, or in bringing the Land to any Degree of Fineneſs, and indeed in both.

This Author mentions, That the Barley Corn which produced the moſt Grain was tranſplanted; and under the Head of Wheat I have mentioned ſeveral Advantages ariſing from that Method of Management, which I ſhall enlarge on farther hereafter; and the ſeveral Advantages that may ariſe to them thereby, which I apprehend may be in ſeveral Particulars equally applicable to Barley, and ſeveral other Species of Corn, and many Vegetables as well as to Turnips.

How far ſuch a Procedure may improve the Grain or Vegetables tranſplanted is yet uncertain, but may very well deſerve the Conſideration of the Curious, and the trying it in various Particulars; for to name only the Improvements made in the now ſo much valued Aſparagus, which is known to grow wild in the Meadows in ſome Parts of ENGLAND, and there is not eatable. It hath undoubtedly obtained its delicate Taſte from the ſeveral Tranſplantions, and different Methods of Management it hath met with under the Gardener's Care. We are all ſenſible what Changes appear in Barley, when made into Malt, what Alterations are made in the Flour of Wheat by the Baker, when he improves it into Bread; and the Changes of Milk into Butter and Cheeſe, by the Methods uſed in making them, were they not ſo common would be Matters of great Surprize to us.

There are ſeveral Inſtances of very great Produce of Barley. PLATT's Friend plowed twenty Acres of Graſs Ground, after croſs plowed it, and harrowed it three or four Times to kill the Graſs, and mingle the fat with the lean, and ſowed it in the Beginning of MARCH, and had thirty Quarters per Acre, and ſold it that Year at four Shillings per Quarter.

Sprat Barley has often produced ten or eleven Quarters when ſowed in MARCH, tho' other Soils have produced but three or four.

To which I ſhall only add, that M. NUNN, in the County of ESSEX, had the laſt Year a large Field of Barley, which together produced eight Quarters per Acre. This is certainly very good yield, and what Land proper for Barley, with good Management, may reaſonably be thought to produce in Quantities, in a good Courſe of Huſbandry.

Of RYE.

Rye has been generally thought the next beſt Bread Corn to Wheat, and accordingly was formerly very much uſed for that Purpoſe, and is ſo ſtill in ſome Places; ſometimes alone, but then it has a peculiar Sweetneſs, which is generally diſagreeable to thoſe who are not uſed to it, and ſubjects many to Cholicks and Looſeneſſes, and the Bread made of it is black and heavy.

But a ſmall Quantity of it was formerly, and ſtill is in ſeveral Places, mixed with Wheat in the making of Bread, on Account of its keeping the Bread moiſt, and then is attended with no ill Conſequences, but is rather thought to render the Wheat more tender, freſh, and agreeable to the Taſte. And it was the more cultivated on Account of its being the Product of barren, gravelly, ſandy Land, which was then thought capable of producing nothing elſe, or very little worth the Farmer's Care.

The common or Winter Rye requires a Summer's Fallow, and more Expence and Trouble in the Management of it, then it is found to anſwer well; ſince the great Improvements made of thoſe dry ſandy Soils proper for it, by the Advantages made of ſuch Sort of Soils, by the ſowing of Turnips, and ſeveral artificial Graſſes, and the great Profit made by them; and from the ſeveral Species of Corn, they give the Farmer an Opportunity of raiſing much more advantageous than Rye: this muſt, on Courſe, ſink it in the Huſbandman's Eſteem, and make it in general to be much leſs regarded.

There are two Sorts of Rye.

Firſt, The common or Winter Rye.

Second, The leſſer or Spring Rye.

The firſt Sort is what is uſually propagated amongſt us, and generally on ſuch dry barren Land as is above-mentioned, where better Corn will not grow.

The ſecond Sort, or ſmall Rye, is to be ſown in the Spring, about the ſame Time when Oats are. It is apt to run into Straw if it prove a wet Seaſon, and this Sort is generally lighter than the other; however, it may be very conveniently uſed where Wheat or other Autumn Crops have miſcarried.

Two Buſhels are commonly allowed for Seed to an Acre, and four Loads generally reckoned a middling Crop; and it uſually carries equal Price with Barley, and about one half of the Price of Wheat.

In ſeveral Places they ſow Rye together with Wheat on the ſame Ground, and then it is called Maſlen, that is, Miſcellane, and will then bear a Price in Proportion to the Quantity of Wheat which is mixed with it.

The beſt Judges think this Sort of Huſbandry to be a very ill one, ſince as the Rye is ripe before the Wheat, and muſt ſtand till they are cut together, the Conſequence muſt neceſſarily be, that the Rye will ſhed a good deal of its Grain; and what is more, the Grains when ſo mixed ſeldom make a Bread that thoſe Perſons can well bear, who have been uſed to Wheat. But the Rye producing a Spirit, it is now ſaid to be much uſed for that Purpoſe, and ſo far may ſave the Wheat; though I doubt ſuch a Uſe of it will prove no great Advantage to our Country.

Rye is a quick Grower, and for that Reaſon the common Sort, as well as the other, ſometimes is ſowed in Spring, when Wheat miſcarries, and has anſwered Expectation: and the ſmaller Rye (as before-mentioned) is very proper for this Purpoſe, as it is uſually ripe at the common Times of Harveſt. The common Sort is ſometimes ſowed ſo late, in order to be plowed

in to fertilize the Ground for a better Species of Grain.

But there is a another more beneficial Proſpect of ſowing it in Autumn, which is, in order to provide Food for Ewes and Lambs in the Spring, when Turnips and Coleſeed are gone, or have failed, and before any other Sorts of Graſſes are grown to ſupport them: and it may be ſowed for this Purpoſe either on Land prepared particularly for this End, or on the Wheat Land after the Corn is carried off, or on other Stubbles when plowed up, or where Turnips have failed, and will probably anſwer Expectation, whichever Method of Management is taken with it for this Purpoſe.

It is certainly the beſt Proof of a Man's being a good Farmer, when he is known to provide proper and ſufficient Food for his Cattle and Sheep for the whole Year in general, and alſo has a further particular View for a ſecond Proviſion for his Ewes and Lambs, in caſe any of the former intended Sorts ſhould miſcarry.

All this he may certainly generally do, if he will but carefully conſider the ſeveral reſpective Times. The common natural, and the ſeveral artificial Graſſes, or Turnips, &c. will continue at the latter End of the Year; and alſo when he may expect any of them to come into his Aſſiſtance in the Spring: and then think of, and provide ſuch other Supports for them in the Time. None of them are to be had in the uſual Courſe of Things, by ſowing either Turnips, Rye, or Coleſeed, by the Help of one or other of which (with God's Bleſſing) he need not much fear but he may have a plentiful Proviſion for his Stock all the Year round. For which Purpoſe Turnips (I apprehend) may be made much more ſerviceable than is at preſent commonly imagined, as I ſhall endeavour to ſhew when I come to treat of Turnips in particular.

It is for the Want of this Knowledge and Care, to provide Greens and Graſſes for their Sheep in the Winter and the Spring, that in many Places in the North they are obliged to prevent their Ewes from having Lambs, till they have natural Graſs on the Ground, to help them to Milk to ſupport them, which is often not till the End of April, and ſometimes not till the Beginning of May; and then they are obliged to eat their beſt mowing Grounds ſometimes to the twentieth of May, before they can turn their Sheep to the Commons, and ſave their Grounds for Hay. If a dry Time then ſucceeds, theſe Grounds are burnt up, and their expected Product of Hay from their beſt Land, wholly, or in a great Meaſure deſtroyed; to the exceeding Diſadvantage of the Farmers, and ſometimes to their Ruin.

And why may not Rye be ſowed for the Purpoſes above-mentioned amongſt Turnips, and anſwer the Farmer's Expectation, eſpecially as the Ground on which Turnips are commonly ſowed, is generally better prepared, and uſually of a better Nature, and in much better Heart than the Land commonly allotted for the Growth of Rye; eſpecially where Turnips are ſowed after the Drill Manner, or managed in the Method we ſhall after mention when we come to this Head.

In plentiful Years Rye may be given to Fowl, or Hogs, which laſt delight in it, and will feed very well on it, when ground, and made into a Paſte, but then they ſhould always have Water, and alſo a few Beans or Peaſe at the laſt, to harden their Fat, which is commonly very beneficial in moſt Methods of feeding them.

This Grain is very ſubject to grow in the Ear, if any Wet comes to it; and it will be ſoon damaged if any green Weeds are mixed with it, ſo that particular Care muſt be taken of it in both theſe Reſpects; both to let it have Time in the Field, to prevent the Weeds making it to give in the Barn, which will make the Corn muſty, and therefore it ſhould be houſed dry, and that as ſoon as ever you can get it ſo.

The keeping it in the Chaff, on a dry Floor, is adviſed for the preſerving it ſweet after it is threſhed; the dry Chaff imbibing any Moiſture which may happen. This Method has been mentioned for preſerving Wheat, and is uſeful in ſeveral other Grains.

Of the OAT.

The Oat is generally placed next after Barley, but is commonly eſteemed of much leſs Value, and is accordingly much leſs regarded and huſbanded; though, if we come cooly to conſider the ſeveral good Qualities it has, and the Profit it produces, and thoſe at how little comparative Expence, we ſhall find it equal to Barley in all Uſes but one, and ſuperior to it in many; and in Reſpect of the Expence and Trouble attending each, and the Profit they reſpectively produce, it will be found preferable to Barley, and perhaps to all other Grain except Wheat.

The Oat generally grows in all Countries, and almoſt in all Sorts of Land; but thoſe Writers are very much miſtaken, who, one after another, roundly affirm, that it will grow in poor Land as well as rich; indeed no Land can well be too rich for it, but whoever expects a good Crop of it from poor Land, will find himſelf ſadly diſappointed. There is one undoubted Proof of its doing well in rich Land, becauſe it is generally firſt ſown when the richeſt Fields and Meadows are firſt broke up (to take off what they call the Edge of the Soil) the Richneſs of which would make Wheat run too much into Straw.

How Oats will anſwer in a rich Soil, I experienced many Years ſince, on breaking up a rich Meadow of three Acres, inclined to moiſture, on a gentle Deſcent, which, with one plowing, and no farther Trouble, it being a dry Summer, produced Stems in general between five and ſix Foot high, and ſome above, and very well headed. And though Oats were then cheap, theſe black ones were generally thought worth fifteen Pounds; and ſome Gentlemen brought in ſeveral of them above ſix Foot high, which were hung up many Years in the Hall as Curioſities. This was clayey Ground, and ſome Lime-ſtone lay above it.

In the ſame Neighbourhood black Oats were ſowed ſeventeen Years ſucceſſively, in an undivided Field, but was ſeveral Times manured, and brought tolerable good Crops to the laſt.

This

This was Lime-ſtone Land, and lay on a Deſcent, and I apprehend might receive ſome Advantage from the Lands above it, by the Waſh deſcending from them.

The Oat is diſtinguiſhed from other Corn, by the Grain growing in looſe Panicles.

There are three principal Sorts of it.

1. The common, or manured White.

2. The black Oats: which are omitted in GERARD and PARKINSON, though in ſome Parts of ENGLAND they are more ſowed than the former.

3. The naked Oat: much ſowed in CORNWALL.

To theſe we may add two others, very conſiderable.

4. The red or brown Oats; and ſome, I ſuppoſe, reckon theſe the red and the gray, and all of them compriſe the large white POLAND Oat, under the Name of White; the Seed of it being brought from POLAND, gave it that Name. And as it degenerates here in a few Years, it is often brought new from thence. It is apt to ſhed after Rain.

The white Oat has undoubtedly the larger Kernel, and turns out more Meal in the grinding than the black Oat; the Meal of a Buſhel of the white being near three Pecks from the Miln, and that of the black but two Pecks; but then the white Oat requires richer Land, and will not bear Cold ſo well; and as to every other Article, but what they call the Yield, the black is equal to the white, if not ſuperior in ſome Particulars.

For the black Oat, as above-mentioned, does not produce equal Quantity of Meal as the white does, Buſhel for Buſhel; but the Meal of the black Oat is as white, or whiter than the other, and is certainly ſweeter. Notwithſtanding what is ſaid by two or three of our beſt modern Writers, the blaek is the moſt made into Bread, and the moſt eaten as ſuch, both in the Northern and ſome of the Midland Counties of ENGLAND, of any Sort whatſoever; and is generally allowed to do leſs Injury to the Ground than the others; and, I preſume, is much more generally cultivated in SCOTLAND, than either the common, white, or the POLAND Oat: nor does it need any Mixture of Wheat to make it wholeſome or palatable when properly made. Nor does it delight moſt in moraſs or fenny Ground, as Mr. LAWRENCE writes; ſince the Crop I had, as before-mentioned, was on very good Ground, ſometimes eaten, ſometimes mowed on a ſtiff Clay at leſs than a Foot deep, lying on a gentle Deſcent, and ſome little Lime-ſtone Land lying above it there are yearly vaſt Quantities of Acres of good black Oats got on Lime-ſtone Ground, which is well known to be very dry Land. But perhaps this miſtaken Notion concerning black Oats, may ariſe on Account of their hardy Nature, and for that Reaſon their being frequently ſown on ſuch Ground, where it is commonly thought no other Grain will grow. The naked Oats, when threſhed, will make Meal without going to the Miln, but it is not ſo good as the former Sorts.

The Uſes of Oats.

Oats being a very temperate mild Grain, are fit for almoſt all Manner of Uſes and Purpoſes any Sorts of Corn can be, and being an hardy Grain it will grow in almoſt any Soil, and that with the leaſt Culture of any Grain whatſoever being very prolifick will, all Things conſidered, be found the moſt profitable of any Grain whatſoever (except Wheat) which ſome think is not much inferior to in this Particular; and may, in one Senſe, be ſaid to be an Improver of Land, as it paves the Way for its producing other Sorts of Grain.

It is commonly known and obſerved, what great Fatigues and Labours the SCOTCH have frequently gone through, when ſupported only by a ſmall Quantity of Oatmeal, which is a manifeſt Proof of the Goodneſs and Spirit of that Grain that could enable Men to go through ſuch Toils and Labours; and it is very well known that the moſt of the Northern Peaſants have little elſe to ſupport them in their hard Labours, particularly in that of getting of Stone; in which Work I have known them to ſweat Day after Day, with no other Nouriſhment but Oat Cake (Bread) and Water; and the better of them with only an Addition of a little Butter and Cheeſe, and a little Whey or Buttermilk to drink, ſeldom taſting Fleſh Meat or any Malt Liquor whatſoever.

Oats, when malted, make a very pleaſant Ale, and are frequently uſed for that Purpoſe: and they are uſed in the Kitchen in a thouſand Particulars, in which the Flour is preferred to the Flour of all other Grains; and there is no Pretence to ſet up any other as equal to it, except Wheat, which to be ſure is to be preferred before it in many Caſes.

It is alſo exceeding proper for the feeding of all Sorts of Fowls, and Swine of all Sorts, makeing the ſweeteſt Bacon of all Feeds; though it is thought very adviſeable to give the Swine a few Peaſe, toward the End of their feeding, in order to harden their Fat.

The Excellency of Oats, as the beſt and moſt wholeſome Food for Horſes, is allowed by all; and that when they have been kept till they are thoroughly dry, there is no Danger of thoſe Diſtempers which commonly attend, and are frequently fatal to thoſe fed on Beans.

They are equally uſeful for the feeding the Cow or the Ewe, to help them to Milk, and to nouriſh their Young; and at the ſame Time will ſupport the Ox in his Labour, or feed him fat the Slaughter. And the Straw is valuable for Food for Beaſts, beyond that of all Grain, and when ſome of the lighteſt Oats are left in it, and only the beſt threſhed out (which is called batting) it is thought very good Food for Beaſts; and Packs of Hounds, and all other Dogs, are commonly fed with Oats, when ground down.

Of the Soils proper for Oats.

As to the Soils, it has been mentioned that they will grow on all, and do very well on moſt, where a Crop of Corn can be reaſonably expected; yet Oats certainly do beſt on the beſt

Ground; for which we may appeal to common Experience, when they are ſown at the firſt breaking up good Ground, or when the Ground is well manured for them, which is common in the North; and in the Inſtances before, and which will be mentioned hereafter, alſo fully confirm the Truth of this.

Oats will do with the worſt Tilths, in the pooreſt Ground of any Grain, and very ſeldom have that Culture they well deſerve, and will anſwer for, in their Produce: dry Ground will agree with them as well as wet, as is abundantly manifeſt by the great Quantity of Oats got upon Lime-ſtone Ground: and the great Produce ariſing thence, ſome Inſtances of which are herein mentioned ſcarce to be exceeded in any other Place, and far beyond the Crops mentioned by our late Writers as the common Product of Oats. I have had very good Crops of them after Turnips eaten on the Land, without any other Manure, the Produce being from ſix to eight Quarters an Acre.

Of Seed Oats, and the changing them.

The Seed uſually allowed for an Acre is four Buſhels; but in ſeveral Places, they ſow ſix or more, where the Ground is poor, or where ſuch an ill Cuſtom has prevailed. In this Article of Seed, the Farmer ought to be careful in getting what is good, and changing it from different Sorts of Soils, as in any Kind of Grain whatſoever, ſince he will find it equally beneficial. It is ſeldom that Oats are ſteeped, nor do they ſeem to want it as to their certain growing: and as to any other Advantages that may accrue to them by ſteeping, the Reader will find them mentioned under the Head of Steeping, and the Practice of it muſt be left to his own Diſcretion.

There is a Saying mentioned, That a quick Man ſhould ſow Oats, and a ſlow Man Barley; becauſe Oats need not be ſown ſo thick as Barley, but according to the Quantity of Seed allowed to each; this is no certain Direction.

Formerly they uſed not to ſow Oats till MARCH, but of late Years they commonly plow for them at the Beginning of FEBRUARY, and ſow and harrow them in from the Middle of FEBRUARY, and ſo on; and now apply to them in this Particular, the Saying, The ſooner in the Ground the ſooner out; and find by Experience, that their Crops are generally ripe ſooner than they formerly were when ſowed later. And as this is their principal, if not only Grain in many Places; they generally weed it carefully, but have not had the beneficial Cuſtom of Rolling it long practiſed amongſt them in the North; nor has it yet generally prevailed, though now found ſo advantageous to it.

Of Reaping.

In regard to the reaping of Oats, the North far exceed the South Country Farmers, ſince they generally ſheer their Oats as carefully, and as clean from Weeds as the niceſt Farmers do their Wheat; and ſome of them bind the Sheaves as they ſheer them: but others more prudently leave them open all the Day, by which the Middle of the Sheaf gets very dry; and then they bind them up, and ſet them in Shocks, ten or twelve in a Shock, as the Farmer pleaſes; two called hooders, being gently drawn over the Tops of, and covering the others, &c. they will ſtand thus many Days without any Damage; and in Caſe of any very ſevere Weather, will, on a dry Day, be fit to load ſo, that if the Farmer have but Patience, it is very ſeldom that Oats ſuffer in the Field; and if they be led moiſt, they ſuffer leſs in the Barn on that Account than any Grain whatſoever, both in Reſpect of the Nature of the Oat, and of the Straw. The uſual Price of Sheering is about Three Half-pence per Thrave, and the North Countrymen are very dextrous at this; and when they come into the South to work, as many of them do in Harveſt, excel the South Countrymen in the Article of Sheering.

If the ſowing be deferred long, as it ſometimes is till APRIL, then it ſhould be well harrowed in; and in ſome Places the Wetneſs of the Land almoſt obliges the Farmer to the ſowing ſo late.

Of the Produce, and other Advantages of Oats.

MILLER mentions Oats as a very profitable Grain, and that the uſual Produce is five and twenty Buſhels; though he has ſometimes known more than thirty on an Acre. This is a very poor Account of the Produce of this Grain, ſince four Quarters are common on very indifferent Ground; and ſix or ſeven is no extraordinary Crop; and ten Quarters are frequently had with only one Plowing without any further Trouble.

I am certain I had an Hundred Buſhels or above of black Oats on an Acre, as before mentioned, with only once Plowing, and that without any Rolling or Manuring whatſoever; and it is very common to have forty or fifty Thraves on an Acre; each Thrave conſiſting of four and twenty Sheaves, and each Thrave, if the Oats be good, and the Sheaves of the uſual Size yielding from one Buſhel three Pecks, to two Buſhels one Peck: ſo that an Hundred Buſhels on an Acre is nothing extraordinary, both in DERBYSHIRE and STAFFORDSHIRE on good Land. And I have known an experienced Farmer in STAFFORDSHIRE had three Hundred Thrave of good black Oats on five Acres on good dry Lime-ſtone Ground, with only common Huſbandry, and once Plowing (as he told me himſelf.) This was thought a very good Crop, but not ſuch a one as to occaſion any Amazement, ſeven, eight and ten Quarters being very common. To which I ſhall add one Inſtance more; which, tho' nothing extraordinary to me, will appear ſo to thoſe who think four Quarters of Oats a good Crop.

The Inſtance I ſhall laſt mention is, that of a Crop of Oats of a pretty large Field of a Farmer in the Iſle of MERSEY in ESSEX; which the laſt Year brought him eight Quarters and an Half of Oats an Acre through the whole Field.

This Crop followed one of Wheat, and he managed his Land after the following Manner:

It being a very dry Time after Wheat Harveſt, he ſet Fire to the Stubble, and burnt it off very clean; after gave the Field three clean Tilths, and laid it on a round Ridge (as they call it) all the Winter, and then ſowed it as uſual with Oats in the Spring, and had the Produce above mentioned.

The three Plowings may be thought an extraordinary Expence (and indeed is very unuſual for Oats) but where the Ground is kept in a good Courſe of Tillage; and a Man with two Horſes can plow two Acres, or at leaſt an Acre and an Half a Day, the Expence is nothing extraordinary. An Acre not engaging ſuch a Team above two Days at the moſt for three Plowings; and a conſiderable Benefit to the enſuing Crop may be reaſonably expected, as well as the keeping the Land ſweet and clean from Weeds, is the great future Advantage that will be to the Land in the ſucceeding Crops of whatever Kind they be.

Another Writer ſays, "Moſt People ſow Oats "for two Reaſons, one becauſe they lower the "Strength of new Ground, and the other to "give old Ground the Benefit of Change of "Seed;" and yet this ſame Perſon allows five Quarters on an Acre as a common Crop, and ſays, "He has known nine, and that they have "often ten Quarters an Acre, when they Ma-"nure the Ground for Oats;" ſo that by his own Confeſſion and Reaſoning, a common Crop of Oats far exceeds a common Crop of Barley. And where the Land has the ſame Manuring for Oats which Barley requires, it hath the Crop of Oats double to that of Barley; and, conſequently, is preferable to Barley, for the bare Profit they will reſpectively bring to the Farmer, the Prices of the one and the other not being uſually much different. But this Preference of Oats will appear more, after we have conſidered the Advantages of Oats, which have by ſeveral been on the whole frequently eſtimated equal to the general Produce of a Crop of Wheat.

The Advantages of Oats.

There are three very conſiderable Advantages the Oat claims, which no other of the white Corns do; nor, indeed, any other Sort of Grain common amongſt us, has any Pretence to vie with it in, with the leaſt Appearance of Reaſon.

The firſt is, that it will grow and pay frequently very well on thoſe Lands, which will not anſwer to the Sowing any other Sort of Grain: and this Advantage is generally allowed the Oat by all who write on this Subject; which they have rather carried to an Exceſs in its Behalf, when they ſay, It will grow in all Countries, and on all Lands; that there is no Ground too rich, or too poor for it; which cannot be ſaid of any other Grain whatſoever. So that in this Reſpect Oats have undoubtedly the Advantage above all other Grain whatſoever.

The next Advantage of the Oat is, That it is pretty certain to bring a very good Crop, on the firſt breaking up any good Meadow or Paſture Ground; of which we have given ſome Inſtances before, and might eaſily add numerous others: but this Advantage is alſo generally allowed to the Oat, that it in this Caſe commonly produces a very good Crop, without any Manner of Expence but of one Plowing and Sowing. And alſo prepares the ſame Ground much better than it could be any other Way for a ſucceeding good Crop of Wheat, which is ſo eagerly ſought for in all the Corn Countries.

The third particular Advantage of the Oat is, The Benefit ariſing from the Goodneſs of the Straw for Food for Cattle; for which Uſe it is uſually ſold in our North Countries, from Four-pence to Six-pence a Thrave; and, conſequently, tolerable good Crops may on a Medium be valued at twenty Shillings per Acre, in which no other Straw can be compared to it as to the Sweetneſs of it for Food; nor indeed is there any other Straw but Wheat of any Value to ſpeak of. And though Wheat Straw excels it for Thatch, yet Oats will laſt ſeveral Years for that Uſe; and, on the Whole, may juſtly have its Straw reckoned amongſt the Excellencies belonging to the Oat.

There is another Advantage it certainly has over the two moſt eſteemed Sorts of Grain, Wheat and Barley, which is, That it is got with leſs Plowing, requires not ſo fine a Tilth, and not near ſo much Manuring in general, as they do to procure an equal reſpective proportionable good Crop; all which will be ſaved in the Farmers Out-goings, and will enter into every wiſe Man's Conſideration. It is not ſubject to Smut, ſo prejudicial to Wheat, and ſuffers the leaſt in a wet Seaſon of all Grain, being as ſoon dry as any, and ſuffering the leaſt when houſed wet.

And as to the general Advantages of other Grains, it may be ſaid to ſtand at leaſt with them on a level; for, it gives the Farmer an Opportunity of varying his Grain, which is one of the general Advantages of Huſbandry; and, particularly in what is called the new Huſbandry. It ſeems not to diſlike the following any other Grain; and to anſwer any Huſbandry which the Situation of the Ground, as to its Goodneſs, will afford it.

It alſo allows a long Time after other Crops are got off the Ground, for the meliorating the Land, by the Benefit of its lying expoſed in Fallows, and to Winter Froſts, before it is neceſſary to ſow it: the Advantages of which are very well known.

Laſtly, It is ſuperior to all other Grain but Barley in its Capacity of receiving the foreign Graſſes to be ſowed with it, from which a great Part of the Advantage of all the new Huſbandry particularly depends, of which we ſpoke before under the Head of Barley, and therefore ſhall not repeat it here, but ſhall only ſay, The Oats has a Right to every Thing ſaid advantageous of Barley in that Reſpect.

A late Writer gives the Oat the Preference to Barley in this Point, in the following Words: "An Oat Crop is the propereſt Corn "of all others, to ſow any of the Graſs Seeds "amongſt, if the Ground is in Heart, becauſe "the

" the Stalks of Oats are apt to ſtand ſtiffer " than Barley, and thereby the Crop of Graſs " is in leſs Danger of being ſpoiled."

This Author juſtly obſerves, " If the Ground " is in Heart," ſince the Land ſet apart for Oats is very ſeldom ſo well manured for Oats, when the Graſs Seeds are to be ſown in it, as it is for Barley; and, conſequently, a leſs valuable Crop of the Graſſes is to be expected when the Land is in a poorer Condition: but the right Way of judging is, when they are in the ſame equal Condition of Goodneſs; and then to ſee, which would anſwer the beſt. But even in this Caſe I would not inſiſt on its Superiority to Barley in this Particular, but only ſay it is equal to it: for the Oat has other ſufficient Advantages above the Barley, as may appear from what is before mentioned here, and above of its Uſes, and from what will be ſeen in the following Calculation.

A Calculation of the Profits of Oats.

In this Calculation I ſhall not take the Produce of a Crop of Oats at nine or ten Quarters, which frequently happen; but at ſix Quarters, which may generally be reckoned a good Crop.

Eſtimating the Value of a Buſhel of Oats at one ſixth Part leſs than the Value of Barley, the Oats will then be to be reckoned at twenty-pence the Buſhel; which being thirteen Shillings and four-pence per Quarter, ſix Quarters will amount to juſt four Pounds for the Produce of the Oat; and the Straw will above anſwer the Sheering, Loading, Threſhing and Cleaning. The other Out-goings will generally ſtand thus: Seed four Buſhels, ſix and eight-pence; Plowing, Sowing, Harrowing, and Rolling, ſix Shillings and eight-pence: Rent reckoned as the Barley, eight Shillings. And though Oats have very ſeldom any Manure laid on the Land in particular for them; yet, in this Caſe, I will allow ten Shillings and eight-pence for Manure. So that the Out-goings will be in the whole, all Expences and Trouble allowed for, one Pound twelve Shillings; which, deducted from four Pounds, the Produce of the Crop of Oats, there will remain two Pounds eight Shillings clear Profit to the Farmer. Whereas the clear Profit of Barley, all Out-goings allowed for, amounted to about eight Shillings. So that this Way there is two Pounds Difference. And if Oats are ſometimes leſs, ſo is Barley frequently: and if Barley ſometimes exceeds four Quarters, Oats much oftener exceed ſix Quarters. So that on the whole, the Oat ſeems to have a clear Right of Preference to the Barley, as to the Profit accruing to the Farmer from them reſpectively: and, on an Average, the Oat will be found to produce twelve or more for one; and few other Sorts of Grain can pretend to do more.

In this Calculation of the Profit, I reckon on the white Oat.

Moſt of our Writers, (though many of them Perſons of very good Underſtanding) inſinuate the great Advantage of Oats to be, that they would grow in the North, where nothing elſe would; and even including in that ſome of our very Midland Counties, as DERBYSHIRE and STAFFORDSHIRE. It may not be amiſs to conſider this Matter, that the Farmer may not be diſcouraged from attempting to raiſe good Corn, Fruit and Vegetables, in whatever Part Providence has placed him; provided he act with Prudence, and engage not too deep at once in any Trials of this Kind.

It was long before it was known, that a Cherry would grow in ITALY, or a Grape in FRANCE; much leſs either of them in BRITAIN. And the great Sir WILLIAM TEMPLE, who lived within Memory, was ſtrongly of Opinion, that no better Wall Fruit than a Plumb would grow beyond NORTHAMPTON, though the contrary is now well known to the Nation.

To come from Generals to Particulars, which ſtrike the deepeſt. It is not many Years ſince, in the Pariſh of ASHEOVER, near CHESTERFIELD, in the County of DERBY, no Wheat was got, though it is now in great Plenty; and all owing (as I have been credibly informed) to a Woman married from a Corn Country, who perſuaded her Huſband to try, as there was Lime enough for Wheat; which proving ſucceſsful, encouraged others, and has ſpread all around.

Another Inſtance fell within my Obſervation, for going once directly from CHESHIRE to LONDON, I ſaw Barley cut and in the Shock, between WINNINGTON BRIDGE and NORTHWYCH; and no other Corn of any Sort cut in all the Way to LONDON, though I took particular Notice.

To which I ſhall only add from Mr. HAMILTON, who reſided ten Years in ENGLAND, and made it his Buſineſs to inform himſelf in Huſbandry. " They there had as good and as " large Carrots, Cabbage, and Parſnips, as ever " he ſaw in ENGLAND."

But having paved the Way for a favourable Hearing by theſe Inſtances, this being a Matter of almoſt general Concern, I ſhall here take the Liberty to enlarge a little on this Point.

Corn, Vegetables, &c. principally owe their Excellence to the Nature of the Soil, the Goodneſs of the Air, a proper Situation, Shelter, and a kindly ſuitable Heat: all but the laſt are undoubtedly to be had in all Parts of the Kingdom, as well as near LONDON; as might be eaſily proved in particular. And in order to ſet the Point of Warmth in a proper Light, I will give the Tables of the different Quantities of Heat, at different Parts of the Kingdom, as they have been calculated by thoſe who are thought well verſed in Affairs of that Nature; and will after make ſome Obſervations on this Subject.

Tables of the Quantity of the Sun's Heat at Noon, when it is vertical at the Summer Solſtice, the two Equinoxes, and the Sun's Entrance into Taurus and Virgo, for the ſeveral Latitudes from 44° to 56°.

In

In theſe I ſhall mention only thoſe we are concerned in, beginning at the Lizard Point, and ending at EDINBURGH.

Degrees of Latitude	Names of Places.	Heat, *June* 10.	Heat, *Ap.* 10. and *Aug.* 12.	Heat, *March* 10. *Sept.* 11.
Vert. Sun	——— ———	100	100	100
50	The Lizard	71	49	26
51	——— ———	69	47	24
51½	LONDON ———	68	46	23½
52	——— ———	67	45	23
52½	YELVERTON, in NORTHAMPTONSHIRE	66	44	22½
53	——— ———	65	43	22
53½	LINCOLN ———	64	42	21
54	——— ———	63	41	20
55	NEWCASTLE ——	62	38	19
56	EDINBURGH ———	60	37	18

The Gentleman who procured theſe Tables and Calculations, very juſtly obſerves, that tho' they ſhew the real Difference of the Sun's Meridian Heat, in different Latitudes, yet they do not account for the greater Number of Hours of the Sun being above the Horizon, which a Northern Latitude has more than a Southern one; which is the principal Thing as to our preſent Purpoſe.

And therefore he aſſures the Reader, in general, and by one round Number, That during all the Summer Seaſon (the Time of ripening Fruits) betwixt the two Equinoxes, there are no leſs than one Hundred Hours of Sunſhine at DURHAM, more than there are at PLYMOUTH; as might eaſily be ſhewn by a particular Table.

There are ſeveral other Particulars which, under this Head, may be taken into Conſideration, in Behalf of thoſe who live Northward, which may ſet them on the Level with, or give them a Superiority over ſome of the more Southern Countries; beſides what this Author mentions of the greater Number of Hours of Sunſhine they enjoy, more than theſe as above-mentioned.

As firſt, the different very good Sorts of Soil frequently found in the Northern Counties, which all allow to be a conſiderable Article in this Point, when compared with ſeveral other Sorts of Soil in the South.

Another Advantage is, that in ſeveral of the hilly Countries, which are the moſt ſubject to be contemned, there are frequent Vallies ſo well guarded by the Hills, from all Manner of unkindly Winds and Storms; and of ſo good a Soil by Nature, and the Produce of which is ſo promoted by the Reflection of the Sun's Heat, by the Poſition of the Hills, that they are as forward as any Places in the South; and allowing them the ſame Culture, would have as early and much ſweeter Produce than the Ground near LONDON would with the ſame Management, and would produce all Sorts of Vegetables, and moſt Sorts of curious Fruits, equal to thoſe in the Southern Countries.

I could name ſeveral particular Places which would anſwer what is above-mentioned, but ſhall rather take Notice of thoſe more generally known.

CHATSWORTH in DERBYSHIRE, the Seat of his Grace the Duke of DEVONSHIRE, though far from being a kindly Situation, or placed on a good Soil, is managed ſo as to produce moſt Things near equal in Goodneſs to thoſe in the South.

And HADDON, two Miles from it, the antient Seat of the Duke of RUTLAND's Family, is on a better (Lime-ſtone Soil) and before it was neglected, and indeed deſtroyed, produced as good Vegetables and Fruit, as then were found in moſt Parts of the Kingdom. And ſtill, though only under a common Gardener's Care, it produces admirable Vegetables and Fruits, which many Years were ſent to BUXTON or CHATSWORTH. But of late Years BUXTON, which was always thought to be placed in as barren a Place, and as unkind a Situation as could well be imagined, and which, within my Memory, uſed to fetch Greens and Vegetables for twenty Miles round, to furniſh the Gueſts with what was proper for them; even this barren Place is now ſo managed, as to produce every thing neceſſary and uſeful, and many Things curious for the numerous Gueſts who reſort to it.

Now theſe Inſtances, with what was beforementioned, will undoubtedly ſhew that the Northern Countries are capable of producing the Grains and Vegetables which ſome would appropriate only to the South.

The whole Earth is reckoned naturally barren, as to the Production of Corn; and clayey Land, which was uſually eſteemed the moſt unkind of all Soils, by proper Culture, is brought to produce the beſt Wheat, the beſt of all Grains.

A Reverend Gentleman, who made this Point his peculiar Concern declares, that after living in the Middle or Southern Parts of ENGLAND, the firſt Part of his Life, on his Removal into the Biſhoprick of DURHAM, he never eat more or better Fruit, even of the later Kind (except Grapes) than after he came into that Biſhoprick; and thinks a Degree or two will have little Influence as to Fruit, in Compariſon of the Soil and Situation; and that, was there as good Markets in the North as at LONDON, all the curious Things ſo much admired at LONDON, would be equally raiſed there. And the Argument is much ſtronger for the well raiſing of Corn and Vegetables, than for the raiſing curious Fruits.

So that on the whole it appears, that the greateſt and moſt conſiderable Difference of Heat and Warmth, for ripening Fruit, Corn, or other Vegetables, ariſes principally from the Nature and Circumſtances of Soil and Situation, from a Place lying on the South or North Side of a Hill, from its being on the Top of a cold Hill or in a Vale; from its being ſheltered or not ſheltered from Winds; from its lying on a cold Clay, or on a warm Sand or Gravel. Theſe are the Circumſtances chiefly to be regarded.

For it is very plain that a Garden, or Land lying on an eaſy Slope on the South Side of an Hill, receives more of the Sun's Rays than the ſame Quantity of Ground lying on a Plain, and hath more real Advantage of Heat from the Sun, than ſeveral Degrees of Southern Latitude would give it, cæteris paribus. And the Argument

ment is ſtronger ſtill, if the Ground in the South ſlope to the North; the ſame Thing is to be ſaid with Reſpect to cold Clays, and warm Gravels, they being guarded or not guarded from Winds and ſo on.

As to the Inconveniencies which are common to the whole Iſland, ſuch as the Inequalities of our Seaſons, the Violence of our Winds, and the ſudden Changes of our Weather, they cannot be ſaid to be more prejudicial to the North than the South; but on the contrary, according to Dr. Derham's Hiſtory of our great Froſt, the South ſuffered then much more than the North, as he and other Obſervers mention, of which they give numerous particular Inſtances.

Theſe Obſervations may not only ſerve to reconcile the Farmer and others to a Northern Situation, but alſo encourage them to equal Induſtry and Application, with thoſe who are ſituated more in the South; ſince they find, that if they act with equal Judgment, they need not fear but they will meet with equal Succeſs.

Hence alſo they may draw many uſeful Obſervations, as to the Manner of ordering their Grain and their Roots, from the ſeveral Advantages they may reap from the different Natures of their Soils, and the different Poſition of their Grounds, as to North and South, and the proper Shelter they may ſeverally enjoy, or which may be provided for them; it being commonly obſerved by Farmers, that the one Side of a Corn Land, in many Situations, is much thinner of Corn than the other. And the ſame may be ſaid of Fruits, and may be applied in numerous other Inſtances.

To return to Oats, there is one other Thing I ſhall obſerve relating to them, which is, about the Manner of keeping them.

Of keeping of Oats.

The Oat has one farther Advantage, that it may be kept the ſecureſt and in the eaſieſt Manner of moſt Sorts of Grain, if not of all Kinds whatſoever.

It was obſerved before, how little ſubject it is to receive Damage when houſed in the Barn, or placed in a Stack, on Account of the Nature of the Straw, which is both ſweet and dry, and the leaſt ſubject to be muſty of any Sort.

Oats will alſo keep very well when threſhed, and laid by in the Chaff, without any further Trouble or Care, provided they be not laid by wet, or wet be permitted to come to them, in ſuch a Degree as would ſpoil any other Corn whatſoever.

But the principal Method of ſecuring the Product of this Grain, where it is uſed as Bread, is by firſt grinding it, and making it into Meal, and then putting it cloſe down in an Ark of Wood, where it will keep good many Years. This Method is ſo well known in the Countries where the Meal is generally uſed for Bread, that there is ſcarce a Family but has one of theſe Arks kept under Lock and Key, either in the Dwelling Houſe, or in ſome Building adjoining to it, or in their Barns. In which thoſe who are able keep a ſufficient Stock for their Families, from Time to Time; and thoſe who can keep it for a riſing Market, oft ſell it at the ſame proportionable Profit as thoſe do who can ſave Wheat till it riſes. It is very common to put four Hundred Pecks of Meal into one of theſe Arks.

Of the BEAN.

The Bean was well known to, and much eſteemed by the Antients; but Mr. Ray obſerves it is diſputed amongſt the Botaniſts, whether their Bean was the ſame which is now uſually ſowed with us; ſince it is very certain, from many Places both of Theophrastus and Dioscorides, that the Bean of the Antients was ſmall and round.

Yet, as he obſerves on the other Side, it ſeems incredible, that a Pulſe ſo common, and of ſuch daily Uſe, ſhould be utterly diſuſed, or change its Name, and have another ſubſtituted in its Place, without any one taking Notice of it.

But if a Conjecture may be allowed in this Caſe, the Bean of the Antients, as deſcribed by Mr. Ray to be ſmall and round, and which was formerly ſo much eaten, ſeems more like what is now called the Magazan Bean, after-mentioned, than that we moſt commonly ſow. And as to the Uſe of its being loſt, or the Name being changed without any particular Notice taken of it, ſo many Things of that Kind have happened, in the Succeſſion of Ages, that it cannot occaſion much Wonder.

Of the Sorts of Beans.

Theſe are principally two.

The leſs or common Field Beans, or Horſe Beans, generally ſowed in the Fields. And

The great Garden Beans of various Sorts and Colours, for the moſt Part white, but ſometimes red.

Pythagoras forbad his Diſciples meddling with Beans; what he meant by this was, that they ſhould abſtain from meddling with the Affairs of the Republick; becauſe the Antients uſed Beans in the electing their Magiſtrates as Diſtinctions when they voted.

The Bean has a papilionaceous Flower, which is followed by a long Pod, filled with large Seeds, the Stalks are firm and hollow, and the Leaves grow by Pairs, and are faſtened to a middle Rib.

The common Farmers ſeldom ſow any but the ſmall or Horſe Beans in the open Fields: but as many of thoſe called Garden Beans are now much cultivated in the Fields, both near London, and in ſeveral other Places, and are equally capable of being managed after that Manner, and that with greater Advantage to the Owner, the one as well as the other, deſerves a Place in ſuch a general Undertaking as this, for the Farmer's Intereſt, whoſe Advantage ought to be particularly regarded in every Point. If it be rightly conſidered, in reality, a Garden is but a little Field well cultivated, and what we call a Field, but a great Garden capable of all the ſame Methods of Management. Which large Field, managed with the ſame proportionable Induſtry, Manure, and Care, will produce a proportionable Profit, both in the Caſe of Beans, and alſo of all Sorts of Vegetables, as will evidently appear to any Perſon who will but walk into the

Fields about Chelsea, Fulham, Battersea, and ſo on.

The principal Varieties cultivated are theſe:

1. The common Field Bean; the Culture of which will be treated of hereafter.

2. The early Liſbon, or Portugal Bean; which is the Sort moſt commonly ſowed by the Gardeners, one of the earlieſt ripe, and principally valuable on that Account; being, in Reality, a coarſe Sort of Bean. It is often ſown in October, or November, and does not require ſo much Sun, as a proper Shelter; which tall Hedges or Trees, when properly placed on the Eaſt, North, or Weſt afford. For it is now well known to the Curious, that both Grain and Vegetables ſuffer moſt in the hard Seaſons, when they are expoſed to the being ſometimes frozen or covered with Snows, and then thawed or uncovered; which prove the moſt deſtructive to what is early of any Weather whatſoever.

Derham obſerves, "That Snow preſerves "Bodies thirty Years uncorrupted, and guards "the Corn againſt cold piercing Winds,* and in his Hiſtory of the great Froſt,† he obſerved, "That many ſmall Fields of Wheat eſcaped "pretty well, where fenced with thick high "Hedges againſt the cold Winds; eſpecially "where they were covered long with Snow. "Thoſe ſuffered more where the Winds blew "off the Snow; and thoſe were the beſt Wheat "which were on ſuch Pieces as lay on gentle "Deſcents, facing the Weſt or South Weſt; "eſpecially when guarded on the Eaſt Side "with a Hill, or a Wood, which fenced off "the cold piercing Eaſterly, and North Eaſterly "Winds."

* *Phyſico Theol.* page 34.

† *Philoſ. Tranſact.* vol. IV. page 122.

Several other curious Perſons confirm the ſame, and obſerve, "That Eaſterly Winds do "more Miſchief ſometimes in Spring after a "few favourable Days, than all the Winter "Froſts; ſince by ſudden Changes of the "Weather, the Paſſages in Trees and Plants "are ſtopped; the crude Sap ſetting, becomes "a Diſeaſe in Trees equal to that of Chilblanes "in Juvenile Blood, which ſometimes takes "whole Trees, and ſometimes Branches only."‖

‖ Vol. II. page 158. 754.

Now this being a Matter of Conſequence, and applicable to ſo many Caſes, I thought it might properly be inſerted here once for all; both for the Sake of the Farmer in the Field, and every private Perſon in their reſpective Gardens. We doubt not but they will take the Advantage of this Remark, by being careful where they ſow any Thing curious, or intended to be early. And alſo to be very cautious not to truſt to a few flattering Days in the Spring, but to wait in nicer Things till the Mulberry puts forth its Leaves before they expoſe them.

It was very common to plant early Beans, and Things of that Kind under Walls, that they might have the Benefit of the Sun: but the Reaſons above, and modern Experience, may inſtruct, that thoſe Situations are frequently fatal, and therefore moſt now rather chuſe to ſet them againſt Hedges, or Reed Hedges run along the Garden for that Purpoſe. And yet with the greateſt Care, and the deſired Succeſs, they will only be found about a Week or ten Days earlier than thoſe ſet in the Spring, and are not to be eſteemed of the beſt Kinds.

The ſmall Spaniſh Bean comes in quickly after the Liſbon Bean, and is a ſweeter, and will conſequently be preferred to the other.

The broad Spaniſh Bean is a good Bearer, and coming in before the common Sorts, is valuable upon that Account.

The Sandwich Bean ſucceeds ſoon after the Spaniſh, and is almoſt as big as the Windſor; is a plentiful Bearer, and a hardy Bean; and conſequently may be ſown much ſooner by a Month.

The Toker Bean is a great Bearer, and comes in about the ſame Time with the Windſor.

The Bloſſom Beans black and white, are very green when boiled, and very ſweet; but the Seed is ſubject to degenerate.

The Windſor Bean is undoubtedly the beſt of all for the Table; and, when gathered young, is the ſweeteſt and beſt taſted of all; and when they have Room, and a good Soil, they are plentiful Bearers, and very large.

Theſe are ſeldom planted till Christmas, becauſe they bear not the Froſts ſo well as ſome of the others, ſo they generally come in June and July in Abundance.

The Mazagan Bean is eſteemed the firſt and beſt Sort of early Beans now known. The Seeds are much ſmaller than thoſe of the Horſe Bean; and, conſequently, ſeem more agreeable to the Sort mentioned by the Antients.

If theſe are ſown in October under a warm Hedge, Pale, and ſo on, and earthed up as they riſe, they will be ready in May, and bear plentifully.

Theſe Seeds were brought from the Coaſts of Africa by the Portuguese, and from them to us, and brought hither as wanted. When the Seed is ſaved here they grow larger, but ripen not ſo ſoon.

Theſe ſeveral Sorts differ pretty much in Shape, require different Times of Setting, and vary in the Time of their Ripening, as well as in their ſeveral Taſtes: and alſo in their Qualities of bearing the hard Weather better or worſe. Notwithſtanding all which, the beſt Writers are of Opinion, that they are only ſeminal Variations, and that they are very ſubject to degenerate. For which Reaſon great Care ought to be taken of procuring proper Seeds; for I once had a Sort of Bean between the Liſbon and Windſor Bean, which was as early, hardy, and near of the Size of the Liſbon Bean, without the Coarſeneſs of the Taſte of it, in which it very much reſembled the Delicacy of the Windſor Bean: but miſcarrying in preſerving the Seed of it as good, and the Friend I had it from being in the ſame Situation, I never ſince could retrieve it.

Beans when about two Inches high, ſhould be carefully earthed up, and ſo as they riſe two or three Times; and, in very ſevere Weather, ſhould be covered with Fern, Peaſehaulm, or ſome light Covering, but to be taken off in mild Weather.

Theſe planting of Beans may be repeated once in three Weeks, and the leſs Care is neceſſary as they come later, and the leſs Seed. The ſet-

ting them at the greater Diſtance will do as they are ſet later. The Windſor Beans may be ſet in Rows at a Yard Diſtance, and at three Inches in the Rows, or rather farther off.

The after Crops ſhould be planted about a Fortnight Diſtance after each other, from FEBRUARY to the Middle of MAY, kept clear from Weeds, and 'tis well to keep earthing them up; and when they are in bloſſom to cut off the Tops of all, which will help to increaſe the Pods, and alſo to deſtroy thoſe Flies ſo pernicious to them: the later the Beans are ſown, the moiſter Ground they require; and it is proper to take off the Suckers, when the Beans are about a Foot high.

This may ſeem unneceſſary for the Farmer, but as ſeveral of theſe Beans are already got into the Field, and others gradually following them, we hope the Reader will receive this Account of them favourably.

Of the Seed, Sowing, and Steeping.

You ſhould take Care in the Choice of Seeds, particularly when brought from diſtant Places, or when had from Strangers, ſince the Crop muſt miſcarry if the Seed be bad; and where it is but indifferent, the greater Quantity muſt be uſed to anſwer for Accidents. And this Care is neceſſary and applicable in almoſt all Caſes, but being of the greateſt Conſequence, the mentioning it cannot be too often repeated.

There may be ſaid to be four Ways of ſowing, or planting of Beans.

The old Way of ſowing them in the Field was generally to plow the Ground, and let it lie ſome Time: then to ſow them in the broad Caſt-way, and harrow them in, which was ſeldom found to anſwer well; the Seed being too much expoſed to be eaten by Fowls, or burnt up in Summer by the Heat, for want of a proper Depth of Earth.

But of late they have generally ſowed the Beans under Furrow, by plowing them in with as thin a Caſt as poſſible; and, in very ſtiff Lands, they harrow the Ground after a Shower, when the Beans begin to peep, which helps to break the Clods, and let out the Tops. But great Care ſhould be taken not to plow too deep, for fear of burying the Seed; and to lay the Turf flat, not edge-ways, that the Beans may be covered with Mould; ſince if they lie hollow, they will be ſubject to grow mouldy and decay.

The ſecond Way is by the Drill Plow, of which Sort of Huſbandry the Beans are ſometimes capable; though a very ſtiff Soil, and the Make of the Bean does not ſuit it well. When we come to treat of Peaſe, we ſhall make ſome Remarks, what Objections are to be made to it, and how far it has prevailed.

The third Method is the ſetting the Beans by Hand, in Rows, in Holes, at about three Inches Diſtance. When the Ground is properly prepared, which the Women will do in many Places for Three-pence the Peck. This is a very moderate Expence; and will be ſaved in the Seed Beans uſed this Way, in Compariſon of what are uſed in the common Method of Sowing. But in this Way I ſhould prefer the making the Holes with a Trowel, rather than a Dibber; which, though it gives a little more Trouble to do it, yet it prevents the Beans from laying hollow; and alſo leaves the Mould looſer about them, and ſo they will be better able to ſtrike freely into the Ground. It comes neareſt the ſowing in Drills made by the Hand Hoe, or by the common Plow; which may be reckoned, The fourth and laſt Way, both theſe are uſed by the Gardeners, who are very expert at the Hand Hoe, and will diſpatch a great deal in a ſhort Time, and plant the Rows at any deſired Diſtances, either to have the Interſtices left open for other Vegetables to grow betwixt them, or for the Beans to ſpread. As for the hoeing them after by the Hand or Dutch Hoe, or by the late Contrivance of running a ſmall Plow betwixt the Rows, as was before mentioned under the Head of Wheat; or, laſtly, for letting Sheep into the Beans in the Fields to eat the Weeds, which they will do at proper Times without prejudicing the Beans.

This Method of ſowing or planting the Beans, ſeems to have every Advantage that can be obtained both in reſpect of the Depth and Diſtance they are to be placed at; and alſo in regard to their being incloſed by mellow Soil, into which they may freely ſtrike every Way.

In Ground properly managed, the common Plow may be ordered to anſwer moſt of the Ends laſt mentioned, and is much uſed for thoſe Purpoſes; and, I preſume, the Method of ſowing by the Hand along with the Plow, as mentioned under the Head of Wheat, may be equally uſeful in the ordering the Beans. And the Gardeners are ſaid to love the Plow in this, as well as ſome other Caſes.

As to ſteeping of Beans it is not very commonly uſed for thoſe ſowed in the Fields, the Seaſon they are ſowed in being commonly wet, and conſequently there being no Occaſion for it, on Account of their being made to vegetate; but the Bean will bear ſteeping very well, and thoſe planted in Gardens late frequently are ſteeped with very good Succeſs.

I ſhall not here repeat what has been ſaid before, about Steeping in general, but refer the Reader to it, where he may inform himſelf of what is neceſſary is this Particular; and therefore ſhall only mention, that I have frequently ſteeped the Windſor and other Beans in Milk, in Milk and Water, in what is called mudgel-hole Water, or the Water coming from a Dung-hill; and in Water in which Sheeps Dung was diſſolved: in theſe ſeveral Liquids, varied different Ways, ſteeping for twelve, four and twenty Hours, and longer, and found they anſwered very well, I do not remember that any of them miſcarried, and theſe are Things eaſy to be met with, and what may be uſefully applied in almoſt any Quantity. I have not named the Kidney Bean above, for I apprehend that would be in the moſt Danger of ſuffering by ſteeping of any Sort.

The uſual Quantity of Seed for an Acre is about three Buſhels in the common Way, which is now found more than neceſſary; ſince Experience ſhews, that when they have more Room,

they

they bear much better both on Account of their having Opportunity to ſpread in a freer Air, and more Sun to refreſh them. And therefore both in the Drill Way of managing them, and according to the Advice of the Perſons beſt ſkilled in the Management of them, they ſhould not be ſet in Rows leſs than a Foot diſtant; and if wider the better, and not cloſer in the Rows than three Inches. The Farmer may eaſily proportion his Diſtances accordingly in any Manner of the planting them, as when the Ground is plowed for them, by miſſing one or two Furrows for their being any Way in Rows, gives him an Opportunity of hoeing and earthing them up: ſowing any Compoſt amongſt them, letting Sheep into them before they bloſſom, to top them if they run too much into Straw, or are infeſted with the pernicious Dolphin Fly, ſo frequently fatal to them; eſpecially when they grow cloſe, and in ſmall Incloſures. Againſt this the topping the Beans is very uſeful, and ſo it is in the making them to pod the better when kept down, and from running too much into Stalk. The Gardeners do this with Sheers, and they may be topt to about two Foot high, or to three in the Field, in the ſame Manner, with no great Pains, or with a Scythe, or a ſhort Scythe fixed in a proper Stick with leſs Labour.

It may not be amiſs to remind the Farmer to take Care frequently to change his Seed, which is very neceſſary to be done ſometimes, in all Sorts of Beans; and not to ſow Beans in the ſame Ground ſoon. The beſt Method of changing is, by bringing Seed from ſtiff Land to that which is lighter, and from the lighter to the ſtiffer.

The Seaſon uſual for the ſowing of Field Beans is, from the Middle of February to the End of March: the ſtrongeſt and the wet Land ſhould be ſown the lateſt, and the other Sorts proportionably ſooner: ſome Regard is alſo to be had to the Weather.

Of the Soil; and preparing the Ground for Beans.

A ſtrong moiſt Soil ſuits the Bean the beſt, and it proſpers better in an open Expoſure than when confined in ſmall Incloſures; where it is moſt ſubject to Blights, and the pernicious Fly above mentioned; all agree that warm light Land is by no Means proper for Beans, though I have known ſome very good ones got on dry Lime-ſtone Ground, in ſmall Quantities in Gardens.

Here it may not be improper to remark, How the Nature of the Lime-ſtone Soil alters the Taſte of Beans, and other Vegetables; the greater Sweetneſs of ſandy Soils than of ſome others, has been frequently obſerved. But I do not remember that the Alteration produced by good Lime-ſtone Ground, has been taken Notice of: which I can be more particular in, as I had Gardens both on dry Lime-ſtone Ground, and on Clay Ground; the former of which produced much ſweeter Vegetables than the latter; tho' thoſe on the clayey good Land would frequently produce larger Vegetables, eſpecially Carrots and Parſnips: and as to Beans, there was ſo great a Difference, that my Beans growing on the Lime-ſtone Land, and thoſe in a neighbouring Village, which was all on the Lime-ſtone, were ſo ſweet, that the Water they were boiled in, had not that diſagreeable Smell and Taſte which common Garden Beans give, but was as ſweet as that Peaſe are uſually boiled in, and was uſed commonly by the Villagers to make Pottage of; and the Beans themſelves had a much ſweeter Taſte than thoſe growing on the clayey Soil. And it is well known, that Lime-ſtone Land is very dry by its Nature, and mine was on the Top of a Hill.

The Vales generally do beſt for the Peaſe, the Chiltern or Up-lands being frequently too light and dry for them; eſpecially if a dry Seaſon follow, or the Ground be plowed oftener than abſolutely neceſſary; by which it will be left hollow, or too light for them to ſtand, which is not the Caſe in the ſtiff Grounds. It will frequently admit ſeveral Plowings for them much to the Advantage of the Crop.

As to the preparing the Ground for Beans, there are two Things to be conſidered: When the Ground is only juſt broke up for them; and when, according to the Courſe of Tillage, it is to be prepared for, and ſet or ſowed with Beans.

In the firſt Caſe the Ground is ſuppoſed to be in a proper Condition for a good Crop, and then ſuch a Produce is expected. Alſo, that it ſhould be uſeful in making the Land mellow for an After-Crop of Corn; and likewiſe, to keep down the Weeds. We are told by a very ingenious modern Writer, That theſe Ends, and much the greateſt Produce will be obtained, if the Drill and Horſe Plow be uſed to ſtir the Ground betwixt the Rows of Beans.

How far the Horſe Plow will anſwer as to Weeds, has been ſhewn before. But the ſtrong Objection againſt it in this Caſe is, That it turns the Weeds toward the Beans, and that it is then more Trouble to get them out there, than the hoeing the whole with the Hand Hoe. I know an excellent Farmer who choſe laſt Year to lay out fifteen Shillings an Acre in hoeing his Beans by the Hand Hoe, as the beſt Way; not that he expected his Beans to pay him, but in order to prepare his Ground clean for a Crop of Wheat to follow; Beans being known not to impoveriſh the Ground, but rather to improve it for Wheat. Though it throws out great Productions, however, it mellows and lightens the Land for After-Crops of Corn: but this Farmer was right where Ground is freſh, and ſome prepared Compoſt on it ſince broke up. The Land is commonly plowed early in Autumn, and they let it lie in Ridges till about Christmass, by which it has the Benefit of Winter Froſts and Weather: the Advantages of which have been before mentioned; after that it is then plowed in ſmaller Furrows. Two Plowings will make the Ground fine enough till it is plowed and ſowed, when the Furrows ſhould be made ſhallow.

The common Method of Plowing and Sowing being directed in a former Part of this Work, I ſhall not meddle farther in that Particular, nor repeat any Thing there mentioned.

p. 103.

In Caſe any Improvement is found proper to be added to them, during the Time of their Growth, almoſt any Compoſt may be ſpread amongſt them; and will preſently incorporate with the Soil, on the looſening it either by the Horſe Plow or Hand Hoe; but he muſt be a bad Farmer who has not his Ground in common good Heart for Beans.

Sir Hugh Plat mentions the ſowing two Buſhels of Salt amongſt the Beans, at ſeveral Times, and why may not ſome Sea Sand be ſowed amongſt them, or ſome Sea Water conveyed amongſt them; theſe are known to fertilize Ground prodigiouſly, and to be great Deſtroyers of Weeds and Vermin; and theſe are ſtill to be had without Duty, and in many Places may be ordered without any Expence, and with very little Trouble. In Cheſhire I have known Brine poured on Pavements, to deſtroy Graſs and Weeds, which it will do effectually; and I ordered a Cart Load of the Sweepings of a Salt-work to be ſpread on a Parcel of very rough Ground, and it being laid thick on about two Hundred ſquare Yards, deſtroyed every Vegetable on it, Furze, Graſs, and ſo on, but would enrich the Ground for the future, and it would, by Degrees, become fruitful, as the Weather, Froſts, Rains, and Winds, and the penetrating Air alter the Salts in the ſame Manner as the Salt Marſhes, when encloſed from the Sea gradually diſcharge their over Quantity of Salts, and become improved into good Paſture Ground.

Small Trials of this Kind are eaſily made, with little Trouble, and at no Expence, and without the Hazard of any conſiderable Damage; and that the Reader may know the Proportion of Salt which there is in common Sea Water, a Gallon of Sea Water will produce about four Ounces: it being inconteſtably proved, by repeated Experiments (ſome of which I have made, and found true) that two Pounds of Sea Water, taken from the Surface, contains an Ounce at leaſt of Salt, or the thirty-ſecond Part of its Weight; and when the Water is taken from the Bottom it will produce ſome ſmall Matter more.

Common Salt weighs about fourteen Pounds to a Peck, the fourth Part of a Buſhel.

There are ſeveral other Things which might be mentioned as proper for the ſame Purpoſe, but ſome of them will undoubtedly occur to the Reader's own Obſervation, from what has paſſed; and others will fall into Conſideration under the Advantages of Beans, which we come next to treat of.

Of the Produce and Advantages of Beans.

A Reverend Author (excluſive of ſome Advantages ariſing from the new Huſbandry) reckons the common Produce of Beans to be about twenty Buſhels the Acre, which allowing three for the Seed is about ſeven for one; and adds, "That "no Grain yields a greater Increaſe than this, "if it is rightly cultivated *, nor turns to "greater Profit to the Huſbandman." He then mentioneth one ſingle Horſe Bean producing ninety Pods or Kids, containing two Hundred and thirty-two Beans, which the next Year produced three Gallons; the next Year ſeven Buſhels and an half, the next Year ſeventeen Quarters and two Buſhels in four Years from one Bean.

* p. 103.

But what is two Hundred and thirty-two Beans from one, in Compariſon of three or four Thouſand Grains produced from one ſingle Wheat and Barley Corn, of which certain Proofs have been before-mentioned; or what is the Produce of ſeven Buſhels of Beans for one, in Compariſon of above ten for one commonly had from Wheat, or twelve or more for one commonly had from Oats.

A very ingenious Writer mentions thirty Buſhels as a Produce of Beans not uncommon from good Vale Lands, per Acre, and that there may be an Increaſe of ten Buſhels the Acre more by the modern Huſbandry, if regularly purſued.

Now taking the Produce at thirty Buſhels as a Medium, which to be ſure is a full Allowance, and deducting the Seed there will be twenty-ſeven Buſhels clear, which, at two Shillings per Buſhel, will amount to two Pounds fourteen Shillings.

Out of which deducting Rent eight Shillings.

Three Plowings, twelve Shillings.

Harrowing, Hoeing, and Weeding, eight Shillings.

Reaping, Loading, and Threſhing, ſix Shillings, for the Straw is of no Value to ſpeak of; the whole of the Outgoings are one Pound twelve Shillings, which being deducted from two Pounds fourteen Shillings the whole Produce, there will remain clear, one Pound two Shillings.

But what is this, compared with the Profit of a middling Crop of Wheat, or ſuch a one of Oats; and yet, in this Eſtimate I have deducted nothing for any Manure which Beans may want, or occaſion, the Want of to continue the Ground in a proper Courſe of Huſbandry.

But we ſhould not do Juſtice to this Species, ſhould we omit any other Advantages it is uſually attended with, or may be thought reaſonably capably of producing, either according to the old or new Huſbandry.

Beſides the Profit above-mentioned, it gives the Farmer an Opportunity of changing his Grain, and conſequently ſo far occaſioning the Production of better Crops of Wheat, Barley, Oats, and Clover, in their ſucceſſive Turns as was before-mentioned, and fully proved; it being undoubtedly true, that the longer any Grain is deferred before it is ſowed again on the ſame Ground, the better the Crop may reaſonably be expected to be.

Another Advantage of Beans is, that they give an Opportunity of planting or ſetting other Roots betwixt the Rows, which will not hinder the Growth of the Beans, and may bring in a conſiderable Profit; and whoever looks into a good Gardener's Ground, will ſoon ſee ſuch Varieties of this Kind, as to give him ſufficient Choice of this Sort. This the Gardeners call, under cropping, and great Variety of Vegetables, as Carrots, Turnips, Lettuce, and many more of the ſame Nature may be ſowed or ſet in the Interſtices.

Peaſe have frequently been ſown, and are thought

thought to do tolerably well with Beans, and it is ſaid may be advantageouſly ſupported by the Beans, but I apprehend that wherever they claſp round the Beans, there can be no Expectation of any Pods from the Beans as far as the Pea reaches; however, Peaſe may be ſafely ſowed betwixt them, when the Beans are ſet in Rows two Foot aſunder. Which Diſtance the beſt modern Writers allow as producing the beſt Crop, where there is tolerable Compaſs of Ground, which is the Caſe when Beans are ſowed in the Fields, which we are now upon.

Turnips ſowed betwixt the Beans would be found to anſwer very well, both as a Crop of Turnips, and for the keeping down the Weeds, which would be here a conſiderable Article.

When the Ground is hoed, or the Beans earthed up, the Turnips might be ſowed with very little Trouble or Expence, and the Mould would then be looſe for them to ſtrike in; and there would want nothing but a raking them, to cover them a little, and there can be no Doubt of their ſucceeding well.

Or if ſome Turnips were tranſplanted, and ſet at ten Inches or a Foot diſtance betwixt the Rows, this Work would be readily done, and undoubtedly produce very large Heads, as I have frequently experienced in often removing Turnips; which is alſo done when they are tranſplanted for Seed, and I ſhould not doubt their producing good Turnips too, and large enough for all uſeful Purpoſes; though ſuch a tranſplanting muſt be thought to give a Check to their Growth, but that may be allowed for in the Time appropriated to them.

The Drill Method of ſowing is thought not to ſuit Beans very well, both on Account of their Shape, which is an Obſtacle to their falling regularly in the Rows; and they requiring a ſtiff Land, and being frequently ſowed in the rich Vale Land, this Method of Huſbandry does not well ſuit that Sort of Ground, as one of the warmeſt Writers for the Drill Method of Huſbandry confeſſes.

Of reaping Beans.

Beans are uſually reaped with Hooks, after the ſame Manner Peaſe are, or ſhorn after the Manner of white Corn; and in both Ways after bound up in Sheaves, and ſet on an End together, as Wheat is in the South.

They are commonly bound with Straw Bands, but the better Farmers buy a coarſe Sort of Hemp Twine by the Hundred Weight at a ſmall Expence, and cutting them into proper Lengths, bind up the Bean Sheaves with them; and this makes every thing after eaſy and commodious in the Management of them; and by allowing about three Inches more than neceſſary the firſt Year, for the Loſs of cutting them open when laid on the Floor for threſhing, they will ſerve two Years very well.

Beans are frequently malted, and mixed with other Malt for brewing of Ale, and anſwer to ſeveral very good Purpoſes.

Of keeping Beans.

Beans will keep in Sacks in a common Chamber very well, for a conſiderable Time, or in a Stack in their Straw if dry when placed there, and kept dry. And ſome keep them in Hair Bags, to ſecure them againſt Vermin.

There is an odd Cuſtom in ESSEX, of putting four Buſhels in a Sack, and at HEMPSTED Market, not far from St. ALBAN'S, ſo famous for Wheat, is a worſe, for they put five Buſhels of Wheat in a Sack, which is above three Hundred Weight.

In the midland Counties they only put two Buſhels into a Sack, and two ſuch Sacks on an Horſe for a Load to the Market, which Sacks are readily and eaſily carried about; and anſwer every uſeful End the above Methods of theſe Southern Counties can be thought to do.

But to facilitate the Removal of theſe Sacks in their Granaries, and other Places, they have a ſmall Machine in ESSEX, and I ſuppoſe in other Places, which does it with great Eaſe; and as it is very convenient, and may be greatly improved, and coſts but one Shilling and Eight-pence, or two Shillings, the making, I ſhall here give the Deſcription of it.

A Machine to wheel Sacks of Corn, in Granaries, Corn Chambers, &c.

It goes on two wooden Wheels, the Diameter of which is five Inches, pegged on the Outſide with wooden Pegs through the End of the Axle-tree, which is eighteen Inches long, and where ſquare an Inch and an half, and faſtened in the Stilts, which are there a Foot aſunder, and the other is round for the Wheels to run on.

The two Stilts which guide it, are like thoſe of a common Plow, are three Foot ſix Inches long, and kept aſunder and firm by a Slat let through them at two Foot high, where the Stilts are better than fourteen Inches wide betwixt them, and two Inches and an half on the Side, and an Inch and an half Front, and grow narrower in the Subſtance, but wider betwixt them to about ſeven Inches, and then are rounded and bend backward to handle them by.

At the Bottom a Board four Inches and an half broad, and an Inch and half thick, is let a little into the Axle-tree and Stilts, and ſloped downward; and the under out Edge of the Board is taken a little off, ſo that it falls near level with the Bottom of the Wheels, and the Machine ſtands upright when ſet on the Level, but is bent backward by the Handle when the Sack is on it, and the Sack will reſt on it as it ſtands.

An Iron Plate an Inch and an half broad, is nailed ſix Inches on the Bottom of each Stilt, and along the Axle-tree, and two Inches over the bottom Board, to ſtrengthen it.

Croſs the Outſide of the bottom Board a Rib is nailed, an Inch and an half at each End, even ſo far, but the Middle riſes gradually each Way to a thin Edge, which, on bending the Stilts forward, goes under the Bottom of the Bag, and when the Top is pulled on it to the Stilts, and this keeps the Sack from ſlipping off.

The Subſtance of the Weight reſts on the Wheels, and is eaſily turned any Way by the Stilts or Hands.

Moſt People know the Weight a Perſon may draw or wheel with Eaſe, in Compariſon of what they can carry; and the common Waggoners

goners draw three Ton with five Horſes, when twelve Hundred would be a ſufficient Load for them.

And why may not a Board be fixed to it at the croſs Bar, and be opened when wanted, and ſet on the Foot Board by an Iron, to drop down and hold it, as is often done in Seats; on which almoſt any Thing might be carried from Place to Place, or the Wheels might be made deeper, if thought neceſſary, or a Pair of larger Wheels occaſionally be eaſily put on the ſame Axle-tree.

To theſe Articles we ſhall add four more of the Pulſe Kind, Peaſe, Tares, Chiches and Lentils; and thence we ſhall be led according to the Courſe marked out in our Plan, to the Graſſes.

CHAP. I.

Of Peaſe.

THE Pea appears to us at preſent under ſo many Forms, that there is need to explain them ſeparately; diſtinguiſhing which properly belong to the Farmer, and which ſolely to the Garden. About great Towns, particularly London, the Farmer ſows ſome Kinds of the Garden Pea, and the Gardener makes his Plantation in the Fields, ſo that they intrench upon one anothers Province. There are therefore ſome Kinds of Peaſe to be conſidered as being brought into Uſe in common between them; others that are peculiar to the Farmer; and another Claſs, that the Gardener is alone concerned withal. Of the two former we ſhall treat in this Place; with the third, the Farmer haveing no Concern, we ſhall not meddle.

It will be firſt proper to ſhew the Huſbandman what the Pea is; what are its really diſtinct Kinds, and what its Varieties: for theſe laſt are by much the moſt numerous, and are called by peculiar Names, as if diſtinct in their Nature like the others. The Art and Induſtry of Gardeners will vary theſe for ever, but the ſtrict Obſerver will conſider them as accidental, not real Changes.

The Pea is a climbing weak Plant, with long ſlender Branches, and numerous Leaves, furniſhed with Claſpers or Tendrills, by means of which it lays hold of whatever ſtands near for its Support. The Flowers are of that Kind, Writers call Papilionaceous, from their reſembling in Form a Butterfly, in Latin Papilio; and they are ſucceeded by Pods, in which are contained the Peas, which are naturally round; but vary in Size and Colour according to the Species, or the accidental Variation made by Culture.

The Flower of the Pea ſtands in a little green Cup, formed of one Leaf, divided into five Parts, the two upper of which are larger or broader than the others.

The Flower itſelf is compoſed of four Leaves, in the Manner of the others of that Kind. One ſtands upright and is very broad, two ſtand ſideways, and are ſhort and roundiſh. The former Botaniſts call the Vexillum, theſe two the Alæ; the fourth Leaf ſtands at the Bottom, and is ſhort and compreſſed, this is what they call the Carina.

Within this Flower ſtand ten Filaments, nine of theſe are ſhort, and grow together; and one is longer, and ſtands ſeparate. This Diſtribution of the Filaments gives Origin to one of the new Claſſes in Botany, called Diadelphia. All theſe Filaments have roundiſh Buttons on their Tops.

Among them riſes the Rudiment of the Fruit or Pod: this, while the Flower laſts, is very ſmall and flatted; and there riſes from it a membraneous Thread, to the Side of which, near the Top, there grows a little Head pierced for the Reception of the Duſt, from the round Heads of the Filaments.

This Duſt impregnates the Seeds, and when the Flower is fallen they ſwell, and the Rudiment grows with them, forming the Pod and Peaſe. We ſhall hereafter mention thoſe Varieties of the Pea riſing from Culture; but are here to take Notice that there are four Species, which, from their general Form and Manner of growing, are plainly and really diſtinct Kinds, owing to Nature, not to Art, or the Accidents of Culture: theſe are,

1. The Garden Pea, which may be called the white Pea, or the manured Pea in general. This is the Origin of the ſeveral Varieties hereafter to be named.
2. The Field Pea.
3. The Sea Pea.
4. The ſimple leaved Pea, or Ervilia.

The firſt, or Garden Pea, is known by haveing winged Leaves, and ſeveral Flowers upon one Foot-ſtalk. The ſecond, or Field Pea, has but one Flower upon each Foot-ſtalk. The third, or Sea Pea, has an angular Stem, and ſeveral Flowers upon each Foot-ſtalk. And the fourth differs from all the others, in that it has ſimple or ſingle Leaves.

What are called winged Leaves, are compoſed each of ſeveral Pairs of others; but this has them ſingle. The firſt of theſe is the Pea we commonly cultivate in Gardens, the ſecond is that ſown in Fields in moſt Places in the Country: and under each of theſe really diſtinct Species, there are many leſſer Varieties: the third, or Sea Pea, is wild in England, it grows on the Sea Coaſts, in barren naked Clifts of Rocks, and among Pebbles where no Earth is ſeen to give it Nouriſhment. The fourth is a Native of the Greek Iſlands, and of ſeveral Parts of Europe.

It is a memorable Circumſtance, that in a Time of great Scarcity of Proviſion, the People about our Coaſt found the Sea Pea in great Plenty, and fed upon it. Till Neceſſity had ſent them to its Stores, they never had obſerved it, and they then thought it ſent by Miracle to their Relief.

The Reaſon of its growing and thriving where no Earth appears is, that it ſends the Roots to a great Depth, and then finds it. The Produce of it is very great in its wild State, as appears by the Numbers who were in that calamitous Time ſupported by it; and there are Reaſons enough to try how it would anſwer by Culture.

There are many Acres of naked and waſte Sea Beach in this Kingdom, on which nothing uſeful grows at preſent; it would therefore be highly worth while to try what would be the Effect of ſowing this Native Sea Pea upon them.

We ſee it will ſerve for Food to ourſelves, but if only for Cattle, it would ſtill be worth raiſing.

CHAP. II.

Of the Varieties of the Garden Pea, called the ſeveral Kinds of Garden Peaſe.

WE have ſhewn what the Pea is, and what are the really diſtinct Kinds of it: we are now to lead the Huſbandman into the Wilds of Art, and enter upon the Kinds made from the firſt by Culture. This is a Store almoſt inexhauſtible, and is every Day increaſing. We know how the Floriſts raiſe a Variety of Auriculas, Tulips, and Carnations from a few Original Kinds, and ſo it is in the Peaſe. Good Ground, and careful Management, go a great Way; and the Mixture of the Duſt from the Buttons on the Threads in one Species with that of another, and its going in this Mixture, or ſingly, to impregnate the Seed does the reſt.

One Way or other a great Change is made, and the Table is ſupplied with an excellent Variety at different Seaſons.

If we were writing to inſtruct the Gardener, we ſhould enter at large upon this Head: but as the Huſbandman has leſs Concern with it, we ſhall treat it the more lightly; not omitting it however, as he may in particular Situations find it profitable to fall into the Practice, nor neglecting any uſeful Caution. The three moſt diſtinct Varieties, are, firſt, The great or Rouncival Pea, diſtinguiſhed by its Size. Secondly, The ſquare Pea, diſtinguiſhed by its Shape; and, thirdly, The umbellated Pea, diſtinguiſhed by its Manner of growing, which is in round Cluſters, reſembling an Umbrella. Theſe the Curious look on as the moſt remarkable Varieties of the Pea, but the Gardeners enter into a longer Detail.

Their principal Kinds are, 1. The early Pea, called the Hotſpur, and which Foreigners call the early Engliſh, our Gardeners having firſt brought it up.

2. The Dwarf Pea. This is a low Kind, but the Stalk is much firmer and ſtronger than the common one, wherefore it ſucceeds much better in many Kinds of Soil.

3. The French Dwarf Pea. This is leſs ſturdy than our own, but the Pea is more delicate.

4. The ſoft ſhelled Pea. This has a Huſk ſo tender and ſweet, that it is eaten in the Manner of the French Bean.

5. The large Pea, called the maple Rouncival. This has a beautiful red Flower, and the Pea, when ripe, is variegated with ſeveral Colours. This is ſometimes ſown in Fields.

6. The Crown Pea. This is the ſame with the umbellated Pea before named, but the Gardeners commonly raiſe a ſmaller Kind than that deſcribed by Authors.

7. The Spaniſh Marotto Pea. This is of the Rouncival Kind, very large, when full grown, and diſtinguiſhed in the dry Seed by a black Line.

8. The Marrowfat. This is diſtinguiſhed by the Breadth of the Pod, and the Softneſs and Sweetneſs of the Pea, and is the ſame we uſed to call the Dutch Pea, and the Admiral Pea.

9. The Union Pea. This is one of the Rouncivals, well taſted, but very large.

10. The flat Roundival. This laſt is a great Rarity in ſome of our curious Gardens, and is a Kind of middle Pea between the Rouncival or Marrowfat.

Theſe are the moſt certain and diſtinct Kinds, as they are called; we have already told the Huſbandman they are only Varieties; and, on Enquiry among the Seedſmen, he will have his Choice of many more.

The four principal he ſhould meddle with, if he do with any, are the common White, the Hotſpur, the Rouncival, and the Marrowfat; and as it may ſometimes be his Intereſt to cultivate one or other of theſe, we ſhall lay before him in general Terms, the Methods found moſt ſucceſsful in this Way.

CHAP. III.

Of the Culture of the Garden Peaſe.

EARLY Peaſe are frequently raiſed about London, by the Aſſiſtance of Walls and hot Beds. This is done thus. They are to be ſown under a warm Wall, or Pales, in October. The Earth is to be drawn up about the Plants as they riſe in Height, during the Winter, for by this Means they will be ſecured againſt the Froſts; and having been thus kept alive till the Beginning of February, they are then to be removed to hot Beds made for that Purpoſe, covered with fine Mould, and ſheltered by Frames.

If the Winter be very ſevere, they muſt be covered lightly while growing in the natural Earth; and when taken to the hot Beds, they muſt be planted at two Inches Diſtance, in Rows a Foot aſunder. They will thus flower and produce their Fruit at ſuch a Seaſon, as will make it bear a great Price.

The French Dwarf is a very good Kind for this Purpoſe; but this being a Piece of abſolute Gardening, we ſhall not here enlarge upon it farther.

Theſe forced Peaſe come earlieſt in Seaſon; the next are the Hotſpurs. With the former we cannot adviſe the Farmer, in general, to have any Thing to do, nor much with theſe, for they will take off his Attention from more important Things; if he have Plenty of ſpare Dung, and a Taſte for theſe Matters, he may employ a proper Servant, and it may anſwer: but he muſt not regard them too much himſelf.

The Hotſpur muſt be ſown in a rich Mould, and warm Spot, in the End of October; and the Farmer who will meddle in theſe Things muſt obſerve, that as the Gardeners make Varieties upon Varieties in this Article, that called the Maſter's Hotſpur is the earlieſt and beſt.

He

He muſt get his Seed from ſome honeſt Perſon; and he muſt buy every Year; for if he ſow that of his own Produce, it will degenerate.

As theſe riſe in Height, the Earth muſt be drawn up about their Stems with a Hoe in dry Weather; and if the Froſts are ſevere, ſome old Pea Stalks, or other light Covering, muſt be thrown over them, and taken off when the Seaſon is milder.

Being thus kept alive till Spring, they muſt then be carefully weeded, and kept clear of Slugs. If there be many of them in the Ground, a little Lime carefully ſpread will deſtroy them, and rather forward than hurt the Plants. Thus managed, the Peaſe will bring an early, and large Crop. The Spaniſh Morotto, which is properly a Rouncival, as we have ſaid before, is to be ſown in FEBRUARY; and in the Beginning of MARCH the common Rouncival.

After this there ſhould be a freſh Crop of one Kind or other ſown once in a Fortnight during the Seaſon, and they will in this Manner ripen one after another, and the Owner will be able to ſupply the Market at all Times.

All the Care they require is, to keep them clear of Weeds, and to be cautious not to tear and deſtroy the Stem in gathering.

According to their Size they muſt be ſown at different Diſtances: the largeſt Peaſe the fartheſt aſunder.

We have in this ſuccinct Manner given the Management of the Garden Pea, becauſe not properly the Buſineſs of the Farmer: we ſhall now proceed to what is truly and perfectly ſo, that is, To the Management of the Field Pea, which is a very proper, and important Article.

CHAP. IV.

Of Field Peaſe.

THE Field Pea, like the Garden, is divided into many Kinds, the principal of which we ſhall mention; and aſſiſt the Farmer to underſtand their Nature, and to take the beſt Methods for their Cultivation. Theſe Kinds are,

1. The white Pea. This comes the neareſt to the Nature of the common white Pea of the Garden of any; and its principal Difference is, that it is ſmaller and leſs delicate.

2. The Grey Pea. This is a large and very uſeful Kind.

3. The blue Field Pea, called in many Places the Hog and the Pig Pea, though the grey might as well have been called ſo.

The Huſbandman will find a Multitude of Varieties of each of theſe branched out in the ſame Manner as thoſe of the Garden Kind, and named from the Places where they have been raiſed, and other trivial Accidents; but we ſhall cut off a great deal of Confuſion and Perplexity on that Head, by telling him, That all that vaſt Variety are to be reduced to theſe three principal Kinds; and that theſe being very diſtinct in themſelves, and very ſtrongly marked by their different Colour, he will always find it eaſy to diſtinguiſh the three ſeverally from each other, and know to which Kind he is to refer any of the reſt.

The white, the grey, and blue Pea, are perfectly diſtinct, and require a ſeparate and various Management; but then that which is proper for one white Pea is proper for all white ones, and ſo of the others.

The white requires one Kind of Soil, the grey another, and the blue ſucceeds beſt in a third. This is a very material Conſideration, which we ſhall explain in the ſucceeding Chapter, in the Regard of the others. As it is with Reſpect of Management, ſo it is with Soil, all white Peaſe require the ſame Soil with the common white; all greys the ſame with the common grey; and all blue the ſame with the common blue. This being a Certainty, the whole Trouble of ſtudying thoſe ſeparate Species may be ſpared to the Huſbandman; for, in knowing how to manage theſe three, he knows all that can be required for the raiſing of them all, and need not perplex himſelf with uſeleſs Diſtinctions.

CHAP. V.

Of the proper Soils for the three Kinds of Field Peaſe.

EACH of the Field Peaſe ſucceeding beſt upon its peculiar and proper Soil, it muſt be the Huſbandman's firſt Buſineſs to eſtabliſh that Knowledge thoroughly in his Memory: for on that will depend his Succeſs. Peaſe are very profitable, and a very uſeful Crop on many Occaſions: when he is about to raiſe them, let him firſt examine the Nature of his Land, and then ſuit the Kind to it; for he may in the ſame Field be in a Manner ſure of a large Crop of one Kind, whereas he muſt as certainly have a poor one of another.

It is a very ſingular Thing that there ſhould be ſo much Difference in the Kinds of the ſame Plant, with Reſpect to the Soil they require; but Experience eſtabliſhes that Doctrine; and when Experience is certain, and proved by frequent Repetitions, he is a very weak Man who goes againſt it.

The white Pea being moſt of the Nature of the Garden Kind, ſucceeds beſt upon that Land which is moſt like Garden Ground; therefore let this Kind be ſown in a Field, the Soil of which is fine and rich. A deep mellow Earth, or a rich Loam that is not too ſandy, are the two Kinds of Soil that ſuit beſt with this Species.

The grey Pea is hardy, and loves Moiſture; for this Reaſon a clayey Soil ſuits beſt with it.

The blue Pea is hardy like the grey, but nothing hurts it more than cold and moiſture, therefore its proper Soil is the light, ſandy and dry.

Theſe are the Diſtinctions of Soil for the three Kinds of Field Peaſe, and as we have before obſerved, the Huſbandman needs not trouble himſelf about a Multiplicity of Names, but examine them according to their Colours, and perplex himſelf no farther.

All white Peaſe, of whatever particular Name, love a mellow Earth; all grey Peaſe, a clayey; and all blue Peaſe, a ſandy Soil: this is the general Direction. As there are certain Soils that ſuit them particularly, ſo there are alſo ſeveral diſtinct Kinds of Manures, which beſt agree with them, according to their ſeveral Natures.

In general, Dung is the Manure that beſt agrees with the white Pea; and nothing enriches the Ground for the blue Pea like Lime. As we have mentioned a clayey Soil for the grey Pea, ſome may be ſurprized at our naming Marle as the Manure in which it moſt delights; but we have ſhewn in treating of Manures, that the proverbial Saying there is againſt marling of Clay, is not ſo univerſally true as has been imagined.

Any Soil in which there is Clay, will ſupport the grey Pea profitably; and Marle will be found a Manure that will enrich it excellently for this Purpoſe, at the ſame Time that the Pea itſelf improves it for Corn.

This is an Article of great Conſideration. The Pea not only yields a good Crop in itſelf, when ſown upon its proper and peculiar Soil; but it ſerves the Huſbandman in other Lights. It is always a Method of deſtroying Weeds; it improves the Land on which it has grown, and excellently prepares it for other Crops.

The Article of the particular Soil ſuited to each Kind of Pea, has not been hitherto ſufficiently conſidered; and for that Reaſon the Farmer in general is not acquainted with the great Advantage of this Pulſe.

He finds it ſerve in the Succeſſion of his various Crops, and when Chance directs him to ſow the right Pea upon the right Soil, he ſees the Advantage in its full Light. Theſe are called favourable Years, and the Expectation of them keeps up his Spirits; but what he attributes to ſome unknown Cauſe, may be the Effect of his own Care and Application; and what he thus finds from Chance now and then he may at all Times command from proper Management.

The grey Pea will yield its full Produce in thoſe ſtiff Soils, which ſo well agree with its Nature, without the frequent Fallowings, ſerveing in the Place of a Fallow, while it is yielding all the Time ſo profitable a Crop; and ſo it is in each of the others, only obſerving this proper Management.

In Reſpect of Manures, Peaſe will always anſwer in ſome Meaſure to the Expence of them; and it is to be conſidered, the Profit is not to be expected wholly from theſe, for they exhauſt the Land ſo little, it is not the leſs fit for a ſucceeding Crop.

The general Obſervation is, that Peaſe ripen earlier in Land that is leſs manured; but the richer it is made, the greater is their Produce.

Wheat, the richeſt and moſt profitable of all Grain, follows Peaſe excellently; and the Seaſon of ſowing the Wheat comes ſo naturally after that of gathering the Peaſe, that it ſeems as if they were deſigned to come after one another.

As ſoon as the Peaſe are cut, the Land ſhould be plowed acroſs; after this it ſhould be harrowed, and then plowing it again in the Beginning of October the Wheat is to be ſown.

CHAP. VI.

Of the ſowing of Peaſe.

TWO Articles are to be conſidered under this Head; the Quantity of Seed Peaſe proportioned to the Ground, and the Manner of placing them in it.

The Reader will remember what we have ſaid with Reſpect to the Garden Peaſe; namely, that the larger the Sort, the greater ſhould be the Diſtance of the Plants. The ſame holds good in the Field Kinds: and upon this depends the firſt Article of their Management.

Good Ground will enlarge a poor Pea, and a ſtarving Soil will reduce one that is naturally large in its Size; but we can here ſpeak with ſufficient Certainty, knowing what is the Condition of the three Sorts into which we have divided Field Peaſe in Ground equally favourable.

The Farmer is then to know that the grey Pea is naturally the largeſt Plant, the white the next in Size, and the blue the leaſt.

We have obſerved that a good Soil will enlarge the ſmaller Kinds, perhaps ſo as to equal theſe naturally larger, on a poor one; but there is alſo a Difference in the Size of the Plants among theſe different Varieties we have named, of theſe ſeveral general Species. All this is to be conſidered as the poſſible Occaſion of accidental Variations; but, in general, the Rule is what we have here laid down; and, conſequently, the greateſt Number of Peaſe is to be allowed to the Acre in the blue, and the leaſt in the grey Kinds; the white being kept as a Medium.

We ſay Number in this Place, becauſe the Meaſures may deceive; the grey Pea being larger, conſequently fewer fill the Buſhel. This makes a certain Difference, but not ſo much as is neceſſary in the Management of the Plants as to Diſtance in the Field. The Farmers know this, and proportion their Meaſures accordingly; but though they are right in the Thing itſelf, they fail in the Degree, for they allow too large a Proportion of the great Kind.

The Allowance in the common Way of Huſbandry, in thoſe Counties where the Culture of Peaſe is beſt underſtood, is two Buſhels of the grey to an Acre: they allow three Buſhels to an Acre in the white Peaſe, and four in the blue. But all this is too large an Allowance; nothing ſucceeds ſo ill in a promiſcuous and irregular Sowing as Peaſe, and when they are planted regularly, there may be an abſolute Certainty as to the Quantity and Diſtance. The Time of ſowing Peaſe differs alſo according to the Kinds; though this rather reſpects the Soil to which they are ſuited, than any Thing in the Pea itſelf.

The grey Pea is to be ſown in February, becauſe growing in a cold ſtiff Soil, it makes at firſt but a poor Progreſs. The Time for the white Pea is the Beginning of April; and the blue may be ſown a Fortnight later than this:

this: the Middle of APRIL is the beſt general Time.

The Huſbandman who recollects what we have ſaid on the Nature of Soils in our firſt Book, will eaſily conceive what we mean by this: we have ſaid that ſandy Soils make a quick Shoot in whatever is ſown upon them, and therefore this late Time is very proper, for they have ſtill enough of the Seaſon for their Growth. The white Pea has a Soil of a middle Nature between theſe, and therefore it is to be ſown at a middle Time.

We now come to the Manner of ſowing them; and as a great deal depends on this in the common Way, and more may in a better Practice, we ſhall conſider it at large.

The common white Pea is uſually ſown with a Broadcaſt, and harrowed in. This is that promiſcuous and uncertain Method we have before mentioned, as ſo improper for Peaſe of any Kind.

The uſual Method is to ſow the grey Pea under a Furrow; and this is ſo hardy a Kind, that it may be put into the Ground any Time during the latter Part of the Winter.

The blue Pea is ſown as the white, only thicker, and is harrowed in after the ſame Manner.

This is the common Way in many Places, but it is the worſt of all. The firſt Improvement for the Planting of Peaſe was the Suffolk Dibble, ſo called from its Place of Invention or firſt Uſe. This is a Kind of Iron Rake with the Tines ſet parallel to the Handle. The Handle is of the ſame Form as in the common Garden Rake, the croſs Piece is thicker, and there are four, five, or ſix large Iron Spikes let through it. The Way of uſing it is this, a Man goes over the Field with the Dibble, and Women follow him with Peaſe in their Aprons. He ſtrikes it into the Ground, preſſing down the Tines with his Foot upon the Back of the croſs Piece. Thus four, five, or more Holes are made, into which the Women drop their Peaſe, one into each Hole, and leave them open. This done, the whole Field is lightly harrowed over, and all are covered together.

The Perſon who ſtrikes the Dibble, generally goes over the Field backward and forward in Rows, or Lines, a Foot aſunder, but 'tis done at random, and the Peaſe grow in a ſlovenly and irregular Manner.

This Method is very expeditious, and diſpoſes the Peaſe with a Degree of Regularity; it is therefore, according to the common Practice, greatly preferable to the random Method of ſowing them by Hand; but it is capable of eaſy and great Improvement.

In the firſt Place the Farmer who intends to ſet his Peaſe by the Dibble, ſhould have three Kinds of them made according to the Difference of his Peaſe, and the Diſtance they require in growing. He ſhould have one for grey Peaſe with the Tines five Inches diſtant, another for white with them at four, and another for blue at three Inches Diſtance. The Tines ſhould be longer for the grey than for the others, and ſhorteſt of all for the blue; becauſe Experience ſhews, That the Seed of the grey will bear deeper Covering in the Ground; and this is an eſſential Article; the Seeds of no Crop whatever being more in Danger from Mice, Birds, and Vermin.

When the Farmer has thus provided himſelf with proper Inſtruments for his ſeveral Species, I would have him order the Dibbler to go over the Ground with Regularity, drawing a Gardener's Line acroſs it for that Purpoſe, and working cloſe to it. This would ſet the Rows exactly ſtrait, and would make the work eaſier and leſs hazardous to the Hoers.

The ſeveral Rows might thus be eaſily planted at an exactly proper Diſtance, and that proportioned to the Kind in each. Thus for the common Huſbandry the grey Pea Rows ſhould be two Foot aſunder; the white a Foot and half, and the blue little more than a Foot.

Thus would the Field be planted with perfect Regularity, and the Hoeing and Reaping would be done the more eaſily. There would be a little more Expence, but very little in the firſt Operation; but this would be ſaved in the two others.

We have named here what may be called a middle Diſtance for the ſeveral Species, a finer or coarſer Soil, a richer or poorer Ground make ſome Difference in what is to be done in this Reſpect. The Farmer having here the Medium, will eaſily make the proper Variations.

In ſome Places they follow the Garden Practice in the Field, opening Trenches by Line, and covering the Peaſe, when in the Ground, with Hoes. This is better than the Method by the Dibble, in that it leaves the Earth more looſe all about them, but it is more expenſive, and the other ſucceeds very well.

Having named what are the ſeveral Manners of ſowing or ſetting of Peaſe in the Practice of the common Huſbandry, it is Time to ſpeak of what may be done in this Article by the Drill Plow, and the Horſe Hoe, its happy and proper Attendant.

We have ſhewn how vaſtly many other Crops are capable of being improved by this Practice, but there is none that can be ſo greatly aſſiſted by it as the Pea of every Field Kind; nor any to which it is ſo happily ſuited.

We have ſhewn the Advantage there is in ſetting the Peaſe in Rows by the Dibble, and mentioned wherein the Garden Method of the Trench and Hoe is ſuperior to this; but the Drill Plow anſwers both Purpoſes together; it does better than either by many Degrees, and the Expence is greatly leſs.

We ſhall adviſe the Farmer to uſe this Method preferably to any other, and ſhall give him all the needful Directions for it in a very few Words. Having explained at large in a preceding Book the general Method of Drilling, and the Structure of its Inſtruments, a very little is needful to be ſaid in ſuiting it to the particular Circumſtances of any Crop.

Let the Farmer ſee his Inſtrument be properly made, and let him go over the Field ſowing his Peaſe in double Rows, with a Foot Partition, and with four Foot Interval between every two Pair of Rows.

The Peaſe will thus be ſet in regularly: the Earth will lie looſe about them, they will ſhoot freely, and they will be diſpoſed in the moſt happy Manner that is poſſible for Weeding and Reaping.

CHAP. VII.

Of weeding the Pea Field.

As we have laid down the ſeveral Methods of ſowing Peaſe, we muſt give Directions for the weeding them accordingly, each Manner of ſowing requiring its peculiar Manner of weeding. The general Deſign however being the ſame in all theſe Operations, the Methods ſeverally neceſſary will be laid down in few Words.

When Peaſe are ſown in the random Way, the Hoers are to be ſent into the Field when the Crop is up, and to have Orders not only to cut up the Weeds, but to thin the Peaſe where they ſtand too thick, which they always do in ſome Places, however careful the Hand may have been that ſowed them.

Peaſe are round and ſmooth, therefore they will, from their Shape and Surface, roll about eaſier than any other Kind of Seed. We have ſhewn before how apt Corn is, when ſown in the common Way, to run in Heaps in the Holes, and leave other Parts of the Field deſtitute; but this is much more the Caſe in the Peaſe, becauſe of their Figure, and hence it is that of all Seeds ſown promiſcuouſly they are the moſt apt to riſe in Cluſters. The hoeing them thinner in theſe Places is alſo the more needful, becauſe in no Caſe the Plants more hurt or impoveriſh one another.

For theſe Reaſons the Farmer muſt be careful in his Inſtructions; and muſt keep his Eye now and then upon the People, otherwiſe he will have a much poorer Crop than he need.

When the Peaſe are ſet by the Dibble, made according to our Directions, the Hoer's Buſineſs is reduced to the one Point of cutting up the Weeds: and it is by much the more eaſily done, becauſe he is to work in regular Spaces.

In the other Way, by the Trench Hoe there will be the ſame Advantage of a clear Space to work in; but as the Seeds have been there ſcattered a little at Random, the Hoers muſt be ordered alſo to thin them in the Rows where they meet with Spaces, in which they ſtand too thick.

Theſe are the Methods in the ſeveral common Ways of planting this Pulſe, and the Advantage of the Hoeing is not confined to the preſent Crop; for deſtroying the Weeds, it prepares the Land excellently for that which is to follow.

In the Method we have propoſed of ſowing by the Drill, the Horſe Hoe, as well as the Hand Hoe, is to be employed; and the Effect of this upon the preſent Crop is prodigious, while at the ſame Time it acts as a thorough Fallowing of the Land for that which is to come afterwards.

We have ſhewn to what a Depth the Root of the Sea Pea will penetrate the Earth for Nouriſhment, all Peaſe are enclined to the ſame Particularity; and as few Plants with fibrous Roots penetrate deeper, none whatever ſpreads farther under the Surface at the ſame Time.

This may ſhew as the Reaſon of what we ſee in Practice ſo certainly, that there is no Crop which receives ſuch great, palpable and evident Advantages from Horſehoing.

We ſee how deep the Earth may be moved advantageouſly for Peaſe, and there is no Way of doing this but by that excellent Implement the Hoe Plow; and as the Advantage, in this Reſpect, is much leſs from Handhoeing, which only juſt breaks the Surface, ſo it is in Reſpect of the improving the Ground for future Crops.

When the Drill Plow has been employed in ſetting the Peaſe in double Rows, and in the large Intervals, as we have directed, the Horſe Hoe muſt come in to clear thoſe Intervals and nouriſh the Crop, and fallow the Ground; while at the ſame Time the Hand Hoe is neceſſary among the Plants. This however need be uſed but once, the other muſt be repeated occaſionally, and the Manner of uſing both is this.

When the Peaſe are about four Inches high, the Hand Hoers are to be ſent in, but as they have only a very ſmall Part of the Ground to work upon, a few of them will do for a large Field; and a little Time will be ſufficient.

When the Peaſe are at the Growth juſt named, they will ſtand according to this Method of ſowing, in double Rows, with a ſmall Space between Row and Row, and a great Interval between one Pair of Rows and another. The whole Ground between and about them, will be well cover'd with a young Crop of Weeds, for this is a Time at which they ſhoot in Abundance, and grow quick.

The Partitions or ſmall Spaces between one Row and another, in each Pair, are the only Part where the Hand Hoers are to be employed; the larger Intervals are to be left for the Horſe Hoe, which is to be brought in afterwards.

In this Handhoeing theſe Spaces muſt be perfectly cleared of Weeds, and that being once done, is not to be repeated: for the young Crop being thus once got down, will never be ſucceeded by another in that Place. The Rows at this Time appear diſtinct in the Fields; and there is Room for the Growth of Weeds between one of them and another, but ſoon after this the Peaſe grow to a Height, and meet one another, ſo that no Weed can grow between them.

This Handhoeing being over, the Ground is to be left to itſelf ſome time. The moving and breaking the Earth juſt about the Roots of the young Crop, on one Side, will do them great Service, as they now are young, and ſpread principally at a very little Depth: afterwards they will require a Supply at their greater Depth, and that will be given them by the Horſe Hoe, though it could not by any other Means whatever. This is what they extreamly want, and this is the Reaſon of that vaſt Fertility which will follow the Uſe of the proper Inſtrument to give it to them.

When the Weeds in the Intervals are grown to ſome Height, the Horſe Hoe is to be ſent into the Field: it muſt be carried ſtrait up in the

Midſt of every Interval, and it muſt be ſet to cut deep.

This will tear up the greater Part of the Weeds, and bury the reſt, and will not ſhake the Plants by coming too near them, that being an Accident which, till they acquire more Strength, might greatly hurt them.

If the Farmer be very curious, he may now ſend in his Hand-Hoers again, with Orders to cut up the Weeds cloſe on the Outſide of every Row, as before they did cloſe on the Inſide. They are not now to go over their former Work again: that was confined to the Partitions between one Row and another; and this is in the ſame Manner to be confined ſolely to the Earth, on the outer Edge of every Row, or to thoſe Outſides of each Interval which the ſingle Furrow of the Hoe Plow did not affect.

This is a Thing not altogether neceſſary, but it is uſeful; and will very well pay the little Charge it coſts, in the Encreaſe of the Crop.

While this ſecond Handhoeing breaks off the Ends of the ſhort and ſlight Roots within its Reach, the deep Furrow in the Centre of the Interval, cuts off the Ends of all thoſe longer and more ſerviceable Roots which had penetrated ſo far, and ſpread ſo wide, as ſome at this Period of the Peaſe's Growth will always have done; and from the broken Ends of theſe there will be innumerable others immediately formed, ready to draw Nouriſhment; and they will have a freſh broken Earth eaſily to ſpread in, and full of that Nouriſhment for them.

The Conſequence of this will be an immediate great Shoot of the Peaſe, and they will gather a ſurprizing Strength.

As to the Repetition of this Horſehoeing, the Farmer may be left wholly to his Diſcretion. If he do no more he will be ſure of a great Crop, for this new broken Ground will ſupply the new Roots, and all ſuch others as ſhall ſpread into it with a great Quantity of Nouriſhment all the Time the Crop is to be upon the Ground: but if he chuſe to repeat it twice more, the Advantage will be proportioned in his Crop, and he will be ſure of finding a manifold Return for the Expence.

If he will be thus adviſed, and will give his Crop three Horſehoeings, they are to be conducted in this Manner.

The firſt muſt be given a few Days after the Handhoeing of the Partitions; and the two others at equally diſtant Times between that and the beginning to pod.

In this Caſe the firſt Hoeing is to be performed as mentioned for the ſingle one, very deep, and in the Middle of the large Interval, between Pair and Pair of Rows. And the two following Horſehoeings muſt be more ſhallow, and muſt be carried in the middle Way between the firſt Furrow and the Rows.

Few will perhaps be at the Expence of ſuch a repeated Horſehoeing on a Piece of Peaſe, without ſeeing the Advantage thoroughly explained, but that is in itſelf ſo clear and evident, when the whole Compaſs of the Work is taken in, and the Benefit to the Crop conſidered, that we ſhall be able to ſhew every thinking Huſbandman it is to his real and great Profit.

Two Points are intended by the ſowing of Peaſe; the one to get a profitable Crop; the other to prepare the Land for Corn. Now both theſe will be anſwered in the higheſt Degree by this Method. His Crop will have the Advantage of ſuch a Degree of Nouriſhment, as could not be given to it any other Way, and the Produce will be great accordingly: and at the ſame Time the Land will be prepared for Wheat by ſuch repeated plowings, by Way of fallowing, that there is no Method whatſoever of making it ſo rich, or dreſſing it ſo well for that Grain.

CHAP. VIII.

Of reaping of Peaſe.

THE Peaſe being come to their Growth, are to be watched for the Time of gathering. This is to be timed carefully, for it is of Importance that the due Ripeneſs be obſerved. In the Plantation of Garden Peaſe in the Field, the common Method of pulling them as they ripen is to be followed; but in the Farmer's Concern, where they are not of that Kind, nor intended for that Uſe, they muſt be reaped at once; and it is on this Occaſion the finding the due Degree of Ripeneſs is of ſuch great Concern.

In the gathering by Hand Women are to be employed, and they are to be ſent into the Field daily, to gather as the Pods ſucceſſively ripen, ſo that the Profit riſes daily; and it is to be begun as ſoon as any are fit to pull, and continued as long as there are any in a Condition for Service left. For this there needs no particular farther Direction.

In the Farmer's Pea Field let there be all Care taken in examining the Peaſe, from the Time the Pods begin to ſwell. From this Period till their ripening, which is known by the Size and Firmneſs of the Pea in the Shell, the Owner himſelf ſhould every Day go into the ſeveral Parts of the Field, and open Pods in different Places.

All will not ripen together upon any Ground, but he will thus know when moſt are ripe together.

He will loſe ſome by ſheding, and ſome will be unripe at whatever Time he reaps them, but he is to contrive ſo as to loſe the leaſt by one or other of theſe Accidents. In general it is better to err on the Side of their being under ripe than the other; becauſe thoſe which are but moderately ripened, will thus harden in the drying; whereas, when the Field in general is too ripe, a great deal will be loſt by ſheding.

The beſt Method of reaping is by a Hook with a good Edge, faſtened to the End of a long Handle. A dextrous Fellow will do a great deal of Buſineſs in a Day with this Inſtrument, in a Field of Peaſe ſown in the common Manner; but in one where the Peaſe are planted regularly, the ſame Hand will go through ſuch a Quantity as is ſurprizing.

When the Peaſe are cut down, the Way is to leave them to dry a little upon the Ground; but when they lie in a ſcattered Manner there is more Harm than Good done by this.

The Reaper ſhould be ordered to throw them up in ſmall Heaps, as he cuts them, and thus they will lie conveniently, be leſs in Danger of Vermin, and ripen without ſheding.

Nothing is ſo eaſy as this toſſing them on an Heap, as they are cut with the long Hook; and this ſhould be done in ſo careful a Manner, that the Heaps may lie hollow and light: this gives the Wind free Play among them; and if Rain happens, they are in the leſs Danger of being ſpoiled.

When they have lain in this Manner till the Stalks and Pods are dried, and the leſs ripened Peaſe have got their due Firmneſs, they are in a Condition to be carried in, but that ſhould be done with Care and Diſcretion, that too much be not loſt in the ſhaking.

CHAP. IX.

Of Tares.

THE Tare is a low climbing or drooping Plant, reſembling the Pea in its Manner of Growth, but ſmaller. The Stalks are weak, and lean on the Ground. The Leaves are each compoſed of ſeveral Pairs of ſmaller, of a pale green Colour, and there are Tendrils for climbing or hanging upon any thing. The Flower reſembles that of the Pea in Shape, but is ſmaller, and of a mix'd Purple Colour in the common Kinds, tho' of various Hues in others. The Seeds are contained in ſlender Pods, and are round and ſmall. Their Colour varies like that of the Flowers.

There are two Kinds of Tares, the white and the black. Theſe are named after the Colour of the Seeds, and have little other Difference: they properly are only ſeminal Varieties of the ſame Species; the white Tare riſing originally from the Seed of the black, as the common blue and red Flowers of many Kinds, in our Gardens will occaſionally yield ſuch as are white. In the ſame Manner the firſt Variation in this Kind of Tare is, that the Flower is white, whereas it is purple in the other; and the Seeds afterwards are of the ſame Colour.

Either of theſe may be ſown in Fields, and they will anſwer the ſame Purpoſe; but the common or black Tare is the hardier Kind, and the beſt Bearer.

There may be a great Advantage in the ſowing Tares properly, among the Variety of Articles with which the preſent Practice of Huſbandry gives the Farmer an Opportunity of varying his Crop. They excellently prepare the Land for Corn, and their Produce is of a certain and not inconſiderable Price, being the proper Food of Pigeons, and uſeful to many other Purpoſes.

We have ſhewn the Profits of a Dove-cote, and hope the Reader has been made thoroughly ſenſible of them; wherever there are Pigeons there muſt be Tares raiſed or bought; and this is not their only Uſe, for the Straw, when well dried, is an excellent Food for Cattle. So that upon the whole, the Tare, though greatly inferior to many of the preceding Articles, yet is a very profitable, and very uſeful Crop at proper Seaſons.

CHAP. X.

Of the proper Soils for Tares, and the Management of the Ground.

THE Huſbandman will eaſily know, that if the Tare required a very rich Soil, or great Preparation for it, the Account we have given of its Value, would not make it worth his while to raiſe it; but this is not the Caſe: a very poor Land will ſupport it; and it demands little Preparation.

It is a hardy Product, approaching to the Nature of a Weed; and it will therefore grow either on Land naturally poor, or ſuch as is exhauſted: this is what makes the Farmer find his principal Advantage in its Culture: for it not only thus ſtands in the Place of Barrenneſs, but prepares the Ground for better Crops.

Although moſt Soils will do for the Tare, yet, like all other Plants, there are ſome that it affects more than others. This is a material Conſideration to the Huſbandman. The great Variety of Articles of late Years introduced into his Profeſſion, give him an Opportunity of varying the Crop on every Occaſion, and among theſe inferior as well as among the richer Kinds, he will find a double Advantage in a prudent Choice, which is moſt ſhewn in ſuiting the Species to the Nature of the Soil.

The moſt favourable Land for Tares is a good ſandy Loam. They will ſucceed excellently on mellow Earth, if not too moiſt for them, which is a very common Inconvenience in that Sort of Ground. They will ſucceed very well on ſandy Ground, that is not rich in any Reſpect; and we ſee great Crops of them in the Lime-ſtone Countries, and that frequently where there is very little Depth of Soil.

The worſt Ground for the Tare is a tough wet clayey Soil. In HERTFORDSHIRE, where a great Quantity are raiſed, they find them always ſucceed better on the hilly Grounds than in the Vales.

The Soil and Situation being thus fixed upon, there requires little Care in the making it ready for the Reception of the Seed. By this Choice we do not mean to tye the Farmer down ſo ſtrictly, as that nothing elſe will do but ſuch a Field as we have deſcribed, but when it happens that he has the Choice of two or three, and one of them anſwers this Character better than another, he ſhould take the beſt.

We will ſuppoſe the Field where they are to ſtand, has been pretty well exhauſted by the laſt Crop of Corn. In this Caſe no Preparation by Manure, or repeated Tillage is wanted: all that is needful is to plow in the Stubble; and let this lie to rot; and in Spring to open the Ground for the Seed: theſe Kind of Crops are ſo far from demanding Manure, that they ſerve as Manure to the Land themſelves; and of them all none more than this Species.

CHAP.

CHAP. XI.

Of the ſowing Tares.

WHEN the Land is ready, the next Thing is to take Care of the Seed, and in this the Huſbandman ſhould not be negligent: a little Care coſts nothing, and it enſures a profitable Crop.

Let the Seed Tares be bought or purchaſed by Exchange from ſome Farmer, at ten or twelve Miles diſtant. The Advantage and Uſe of this, in all Seeds, has been ſhewn already; and let the Farmer who is to ſow them take Care to purchaſe ſuch as have grown on a different Kind of Soil from his own.

Thus, if his Field be mellow Earth let him chuſe the Seed Tares from a loamy or ſandy Soil; and on the contrary, if his be ſandy let him chuſe the Seeds from one that is not.

Thoſe Tares are in general beſt for ſowing that are of a middling Size, round, full, and plump, of a ſmooth and bright Surface, and heavy. There is Reaſon the Huſbandman be careful in this Choice, becauſe few Seeds are ſo apt to ſpoil; and all Pains are thrown away upon Land where there is a Defect in the Seed.

The Tare does not grow well unleſs it have been full ripe when gathered; and if it have ſuffered wet in the keeping, it loſes a great deal of its Vegetative Power. Theſe are the two Accidents the Farmer is moſt to fear, and he will be guarded againſt them by the Rules we have given for his Choice. Such Tares as have been gathered before ripe, never get that Roundneſs, Fullneſs, or Weight we have recommended; and if they have been damp, ſo as to get Damage, they loſe their gloſſy Surface, and they do not recover that again.

The Seed being thus choſen, the Quantity is next to be conſidered; and in this the common Practice comes nearer what is right, than in moſt other Seeds. The general Error is the ſowing too much, and what Miſtake there is, is on the ſame Side here, but 'tis not great, about five Pecks are generally allowed to the Acre, but a Buſhel is fully ſufficient: three Pecks will be very well.

There is a greater Crop from a few flouriſhing Plants, than from a great Number which ſtarve one another.

The beſt Time for ſowing them is in the Middle of February. Very little Trouble need be taken about them, for the moſt ſlight ſtirring of the Ground is ſufficient; but of one Thing the Huſbandman muſt take eſpecial Care, which is, the finiſhing what he undertakes in this Way without Delay. There muſt never be more ſown in a Day than can be well covered before Evening; for if they lie expoſed to the Dews of the Night, they contract a Damp that decays a great Part of them; and the reſt grow poorly.

In general, a poorer is better than a more rich Land for Tares. In the former they pod well; in the latter, they are to run into Stalk and Leaf with leſs bearing. There is alſo another Misfortune attending the ſowing of Tares on rich Ground, eſpecially if it be a little moiſt, which is, they are more apt to lie upon the Ground, becauſe of the Weight of the Stalk, and then they rot.

There is an old Cuſtom among the Farmers of Essex, and ſome other Counties, of ſowing Tares and Horſe Beans together: they thrive tolerably well in this Way, but they do better ſingly. There is no Difficulty attending the reaping of them, for they may be very well cut together, when ripe, as they will be about the ſame Time; and the different Sizes of the Bean and Tare make them eaſily ſeparated in the Barn by a Riddle.

CHAP. XII.

Of the mowing and reaping of Tares.

THE Crop being in the Ground will require no farther Care of the Farmer, for they will ſhoot quickly, and grow vigorouſly, ſo that Weeds do not much thrive among them. There are two Seaſons of cutting them, the one for the Straw, as it is called; that is, for the green Plant for the Food of Cattle, the other for Seed.

The firſt may be continued at different Times for ſeveral Weeks, and it is a very wholeſome and profitable Food; the other is only to be done at one Time, that is, when the Tares are ripe in the Pods; and for the knowing the exact Period for this, the Tare is to be watched in the ſame Manner as the Pea.

The cutting them for Fodder is often the moſt important Service they can be put to; as to the letting them ſtand for ripening, it is for Seed, or for Food for Pigeons; but as when the Farmer keeps any Quantity of theſe, as he muſt either raiſe or buy Tares, this is a conſiderable Article.

If a favourable Seaſon follow, the Time of ſowing the Tares will be fit to cut in May for foddering Cattle in the Rack; and, upon Occaſion, they may before that Time ſerve for feeding freſh in the Field.

The great Advantage of all theſe Crops of ordinary Pulſe is, that they cover and ſhade the Ground. The Tare being larger than ſome of the others, ſerves this Purpoſe better than they, and its Seeds, or the ripe Tares being of Uſe, is another Advantage, becauſe it may be kept longer upon the Ground. For this Reaſon, though the Farmer may occaſionally cut his Tares green, yet I adviſe him when he would give the Ground the greateſt Advantage from them, to let the whole Crop ſtand till ripe. In this Caſe the entire Field is covered for a very conſiderable Time, there are no Weeds ſuffered to grow in it, and the whole is mellowed by lying under the Covert of the Stem and Leaves of the Tares, while their Roots draw but little Nouriſhment to impoveriſh it. The Tares being then obſerved from time to time as they ripen, are to be reaped at the Period when they are fulleſt of ripe Pods, and then left to dry in the Field in little Heaps, before they are carried home for getting out the Seed.

CHAP.

CHAP. XIII.

Of preſerving of Tares.

THE Farmer has ſeen how eaſily Tares are damaged by wet, the Conſequence of which is their growing mouldy, or muſty: after this they never recover their right Condition, Look or Value: but, beſide this, there is another Accident to which they are very liable, that is, the being infected with Worms, Mites, and other little Vermin. Now in this Caſe the pulpy Part is eaten, and they become light, duſty, imperfect, and of little Value.

We have told the Farmer how to manage them from the Sowing the Field to getting home his Crop; we muſt now acquaint him with the Ways by which the Produce may be preſerved from theſe Miſchiefs, for his certain Advantage in feeding his Pigeons, ſowing again, or ſelling.

The Preſervation of Tares from both theſe Accidents, depends principally on the drying of them; for, as it is Damp that moulds them, the ſame makes Way for thoſe little miſchievous Vermin, which are always found in damp Tares, but rarely in ſuch as have been properly dried.

We have directed their laying ſome Days in the Field, after cut, for the Pod and whole Plant to dry. After this, when the Tares are got out, they muſt be managed according to the Weather, but one Way or other they muſt be thoroughly dried.

If the Air be very warm and dry, the ſpreading and turning them on a Floor for ſome Days, will anſwer the Purpoſe; if otherwiſe, they ſhould be laid upon a Kiln: but, in this Caſe, the Heat muſt be very gentle, and well moderated, otherwiſe it may do more Harm than the Damp, deſtroying the vegetative Power in the Seed, and injuring it in its nouriſhing Quality.

When the Tares are thus properly ordered, they muſt be kept in a dry Place, and properly ſecured from Vermin. The thorough drying is very eſſential, for otherwiſe they will breed Diſorders in the Pigeons that are fed with them; and, when uſed as Seed, not one in ten will grow.

When they are to be kept any long Time, the beſt Way is to put them up in large Barrels; then ſetting them in a dry, cool Place, they will be out of all Danger whatſoever. I have known Tares thus kept that were good for all Purpoſes at fourteen Years after the Threſhing; and they probably would have kept good as much longer.

CHAP. XIV.

The Thetch, Fetch, or Vetch.

THere are few Occupations among the common Part of Mankind, that give Origin to ſo many ſtrange Terms as the Huſbandmans. We have been careful to explain them in the Courſe of this Work; and, we hope, by that Means have rendered not only our own, but the Writings of others more uſeful: the Subject of the preſent Chapter is an Inſtance. We ſee in moſt Books of Huſbandry written of late Time, the Name of the Thetch, a Plant recommended extreamly for the Improvement of Land. This is a Kind of Pulſe very well known by its Appearance, and by the Shape of the Seed, in the Counties where it is cuſtomarily raiſed: but how is the Farmer in a remote Part of the Kingdom, who wiſhes to bring home the Improvements practiſed in other Places, to know what is meant by this Word? No Dictionary will explain it to him, for there is no ſuch Word in the ENGLISH Language. If he look into the ENGLISH Herbals, he will not find it in any of their Indexes; nay, though ſome of them have a particular Table of barbarous Words, as they are called, the Word Thetch is not among them. The Reaſon is, that it is a Barbariſm of later Origin than the Time of their writing.

In ſome of the Books wherein Thetches are named, he finds them alſo called Fetches, but this is a Word as arbitrary and unmeaning as the former, there being no ſuch properly in the Language. In ſome it is, as they apprehend, farther explained by being written Vetches: but this is a Term that has worſe Conſequences than leaving the Reader in the Dark, for it creates Confuſion. There is ſuch a Word as Vetch in the ENGLISH Language, but it is the Engliſh of the Word Vicia in Latin, and therefore ſignifies the ſame with the Tare.

In the two other Caſes therefore, theſe Writers uſe Words that cannot be underſtood, becauſe they have no received Meaning at all; and, in the latter, they uſe a Word that means ſomething elſe.

If the Farmer in a remote Part of the Kingdom, ſhould from reading any of theſe popular Works, be induced to propagate the Thetch, he could never find any Meaning of that Word except the Tare; and he would therefore, after a great deal of Difficulty, find what they did not mean. Themſelves know what they intend by it, becauſe a Word will ſignify any Thing Cuſtom appoints; but one Purpoſe of this Work being to convey to the Farmer of one County, the Knowledge of another; we muſt make them underſtand one another's Language.

There is a Plant of the Pulſe Kind very frequent in the warmer Parts of EUROPE, the Flower of which reſembles that of the Field Pea, but its Pod is ſhort, and ſeems blown up. This they call in Latin Cicer, and its proper Name in Engliſh is the Chich. Some have called it the Chich Pea, others the Chich Vetch; and in ſpeaking of the Seed, the common Expreſſion is Chiches. When the Chich firſt was brought into Uſe among the ENGLISH Farmers, the Name puzzled them; and as they were accuſtomed to hear it ſpoken in the plural Number Chiches, they by one Miſpronunciation after another, called it Cheches, Thetches, Fetches, and Vetches.

This then is the Pulſe the Writers on Huſbandry mean by the Thetch, and under theſe Names

Names of Chich and Cicer, it will be found in the Writings of thoſe who have treated of Plants.

The Chich, or as our Writers call it, the Thetch, is therefore of the Pulſe Kind, but ſingular in the Shape of its Pod, and in other Particulars. We ſhall firſt make the Reader properly acquainted with its Nature, and its ſeveral Kinds, and afterwards with the moſt advantageous Manner of cultivating it for the Benefit of the Ground.

CHAP. XV.

Of the Nature of the Chich, and its Kinds.

THE Chich, like the reſt of the Pulſe Kind, is a weak and ſtraggling Plant. The Root is inconſiderable, wherefore it does not penetrate deep, nor ſpread far for Nouriſhment, ſo that the Ground is not impoveriſhed by it as by other Growths. The Stalks are numerous and weak, they will grow in the larger Kinds, three Foot long; in the leſſer two Foot; but always lie upon the Ground. This is far from a Diſadvantage to the Farmer, for by thus lying upon the Surface, they cover it the more perfectly; and make it light and hollow.

The Leaves reſemble in their general Form thoſe of the Pea and Tare, but they are more beautiful. Each is compoſed of three or four Pair of leſſer ones, and an odd one at the End, and theſe are all of a very pleaſant green, and notched round the Edges. The Flowers grow from the Bottoms of the Leaves, and are of the Shape of thoſe of the Pea or Tare, but ſmall. They vary in Colour according to the Kinds, being white, red, or duſky, and the Seed is of the ſame Colour, that follows them. The Pods that come after the Flowers are of the ſame general Structure with theſe of the Pea Kind, but they are ſhort, thick, and blown up as it were, and each contains only one or two Seeds. Theſe are not altogether round, but of a painted Shape in one Part, from whence fancyfull People have ſuppoſed they reſembled the Head of a Ram, and the Plant has been called the Ram Chich.

The Chich is a Native of Italy, and ſeveral Varieties of it are cultivated in the Gardens of that Kingdom; as alſo of Spain, Portugal, and the South of France. They raiſe them there as we do Peaſe, and for the ſame Uſe at their Tables; whence their Gardeners, as ingenious as ours, have made innumerable leſſer Varieties. But we are writing for the Farmer, and he is to raiſe them for a very different Purpoſe; therefore all the Diſtinction that he need regard is, that of the two Kinds which from their Size are called the larger and the ſmaller Chich, and from the Seaſons of ſowing them, the Winter and the Summer Chich or Thetch, the large one is the Winter Chich, for being more hardy it ſtands the Cold: the ſmaller one being tender, muſt be ſown in Spring.

The Kinds cultivated in Gardens Abroad are principally three, the white, the black, and the red Chich; they are called by theſe Names according to the Colour of their Flower and Seed, and are not there preferred to Peaſe, but are found better ſuited to the Countries. Our Pea is vaſtly preferable, according to the Accounts of the Italians themſelves, both in its Taſte and Bearing, but it will not thrive ſo well with them as here; and theſe being natural to the Climate, are cultivated in a great Meaſure in its Stead. The English Farmer is to count little upon the Fruit of this Pulſe more than for Seed, therefore he is to ſee it in a proper Light, altogether different from theirs: with him it anſwers two Purpoſes, the feeding his Cattle in the Stalk, not Seed; and the Enriching of the Ground.

This Enriching of the Soil depends partly upon the keeping it clear of Weeds, partly upon the little Nouriſhment it requires, and partly upon the Covering and Shelter it gives the Surface.

This laſt is the greateſt Conſideration; for, when a Piece of Ground is lightly, but thoroughly covered, and little exhauſted, it grows mellow, and becomes, with very little farther Expence, fit for the richeſt Crops. For this Reaſon the large Chich is to be preferred to the other as better covering the Ground: but this is not all its Advantage, for being ſown in Autumn, it provides an early Food for Cattle when they moſt want it.

Notwithſtanding this, the Farmer will find many particular Circumſtances wherein the ſmall or Summer Chich is preferable, with Reſpect to the Time of Sowing, the Nature of the Provender, and the Condition of the Ground.

CHAP. XVI.

Of the proper Soil for Cheches; and its Preparation.

THE Huſbandman is to conſider all theſe little Pulſes in a very different Reſpect from the valuable Grains; as to preparing the Soil for them, that lies in a very little Compaſs, for they are rather ſown to prepare the Land for ſomething elſe; but in the Choice of the Ground, there is a great deal to be conſidered.

He has a Variety of theſe, the Tare, the Chich, and the Lentil: they will all, with proper Management, anſwer the ſame Purpoſe to him, and they will thrive variouſly on different Soils; therefore he is to underſtand what Kind ſuits each, that he may have the double Advantage of enriching his Ground, and increaſing his Crop. For it is particular in theſe Species, that the larger they grow, and the more they yield as Fodder, the more and better they improve the Ground for a ſucceeding Crop: this will be eaſily underſtood from what we have ſaid before on that Head.

As the Tare loves a dry Soil, the Chich will bear one that is ſomewhat damp. It is a proverbial Saying among the Huſbandmen, that no Rain will kill a Thetch, and the ſame Quality of bearing heavy Showers while young, for that is the Seaſon of them, will render it capable of living in a Soil naturally chilled by wet: but this

this muſt not be carried too far. Chiches will not live on a Bog. In all Things there muſt be Moderation.

The beſt Soil for the Chich is a ſoft mellow Earth: the Farmer would not allow this Crop a Piece of freſh Ground for that Purpoſe, but it will thrive excellently upon a rich Field of this Kind after Barley or other Corn.

Such a Soil as this would be excellent, as we have ſaid, for Tares, but there may be Accidents wherein it would fail for that Crop, and yet notwithſtanding which, it would be excellent for the Chich. Thus if a mellow Soil be upon a hard Gravel, that will excellently ſerve for Tares, becauſe the Wet which falls will get through the lower Bed, after it has done its Office to the Roots of the Plants; on the other Hand, if a mellow Earth have a Bed of Clay under it, Tares will not grow upon it, becauſe the Clay holds the Water too much, will chill their Roots, and make the Plants poor and yellow. Now ſuch a Piece of Ground as this will do excellently for Chiches indeed, better than any other: this is a Sort of Difference the Farmer ſhould remark carefully; one of theſe Soils will do for one, the other for the other Crop; and he who if he had ſowed without Conſideration, might have had very indifferent Crops of both, will, by thus examining the Soil, and ſuiting the Crops to it, have very good ones from both.

After a good rich mellow Earth, the beſt Ground for the Chich is a ſtiff Loam.

Loams may be conſidered as Soils of quite different Qualities, according to the various Compoſitions or Quantities of the Mixture. All of them have ſome Sand and ſome Clay: but when the Sand is in the greateſt Quantity, they are looſe and warm Soils; when the Clay, they are ſtiff and binding. In the former Caſe their Dryneſs and Warmth make them very fit for the Tare; and, in the latter, their Stiffneſs and binding Quality retaining Moiſture, make them ſuit the Chich.

The proper Soils being choſen, there is little Trouble in preparing them, but ſome Difference in the Manner of working when the Seed is to be let in, according to the Nature of the Ground.

All that is required for theſe Crops, when they follow Corn, is to plow in the Stubble; this ſoon rots, and is all the Manure that is, or need be allowed for them, the Ground will be in ſufficient Heart to produce them.

CHAP. XVII.

Of ſowing Chiches.

THE proper Management of theſe leſſer Pulſes is ſo conſiderable an Article in the whole, though leſs in their immediate Value, that they are very well produced in a Year that would have been uſeleſs in that Reſpect, being the Time of Fallow; and when they are eaten upon the Ground under proper Regulations, they give the Land, by Means of the Dung and Urine of the Cattle, a very good Dreſſing.

The large or Winter Chich, is to be ſown the firſt Week in October, or thereabouts, and by this Means it will get a good Root, and a ſtrong Head, and will be able to ſtand againſt the Froſts; and, when Spring comes, will puſh ſo vigorouſly, as very ſoon to be in a Condition for eating on the Ground, or mowing for that Purpoſe.

The leſſer Chich, called the Summer Thetch, ſhould be ſown in the Middle of February. The Rains that naturally follow at this Seaſon, puſh it up in the Shoot, ſo that in a favourable Time it will be ready for cutting in the End of May, or very well in the Beginning of June, and may be eaten upon the Ground ſooner. The Winter Thetch, if ſown early in October, will be ſo well grown by Lady Day, that Sheep and Lambs may very well be fed upon it; and this is a Seaſon when proper Food is ſo much wanted for them, that they may very well pay the Expence of getting it up ſo ſoon.

The firſt Thing to be conſidered toward the Sowing, when the Land is ready, is the Choice of the Seed; and after what we have ſaid with Regard of Tares, a few Words will give the neceſſary Information in all Pulſe: the Danger is, that there are Vermin, and that there have been Damps, this may be diſcovered by the dead Look, or the duſty Appearance of the Seed; and, in either Caſe, that is to be rejected. Let the Farmer chuſe ſuch as is bright, weighty and free from Duſt, and he will not be diſappointed.

The Quantity would naturally come next to be conſidered, but in this, as the Manner of Sowing, ſuited to different Soils, makes ſome Variation that muſt be explained firſt.

If the Soil be clayey, or of a ſtiff Loam, the Manner of Sowing muſt be this. The Ground muſt be broke with the common Wheel Plow, and the Seed ſcattered in by Hand in that Manner the Farmers call ſpraining of it, in Ridges. It is thus to be plowed in; and after this, the Land is to be harrowed even, only leaving Water Furrows between the Ridges.

In this Manner the Accidents attending leaving the Seed uncovered, which are the ſame with Reſpect to the Chich, that are in the Tare, are prevented. None of the Seeds are left expoſed to the Dews of the Night, which would have very bad Conſequences.

When the Soil is a mellow Earth, with a proper Bottom, I ſhall adviſe the Farmer to ſow his Chiches in broad Lands, with a ſingle Plowing, harrowing them well in.

The Uſe of the Crop is alſo to be conſidered before the Sowing, that a proper Method may be taken to prepare in Time for it. Thus ſome are of Opinion, that eating on the Ground is beſt, and others prefer the Mowing and carrying off. This, when the Land is of a middling Nature, may make a Difference in the Manner of Sowing; and when any one of theſe two Methods are rendered neceſſary by the Quality of the Ground, the Huſbandman muſt conform to that Neceſſity, rather than to the common Opinions. We mean this. When Chiches are ſown on Ridges, they ſhould be eaten upon the Ground, becauſe Mowing is difficult in this

Condition

Condition of the Land; on the other hand, when they are ſowed in broad Lands 'tis beſt to mow them.

In general mowing is much the beſt Method. All Cattle tread down and deſtroy more than they eat, and it is a Certainty in general, that the Produce of one Acre mowed and carried to the Rack, will go as far as that of two eaten upon the Spot.

As to the eating of Sheep and Lambs they do leſs Damage than ſuch Cattle as have broader Feet, and their Dung and Urine, and the Moiſture from their Bodies where they lie, gives a Richneſs to the Ground that may, in many Caſes, make amends for the Damage: but this is not the Caſe with Horſes. In wet Seaſons they cannot be turned in at all; at beſt they deſtroy a great deal by their ſpreading, heavy Feet, and they can come upon the Ground but once; whereas the ſame Crop may very well be eaten twice by Sheep and Lambs in Spring.

The Nature, Manner, and Differences of plowing being thus underſtood, we may ſpeak of the Proportion of the Seed which varies accordingly.

When the Chiche is ſown on Ridges, after Wheat or Barley, two Buſhels and a half of the large or Winter Sort will be a proper Allowance to the Acre, and of the ſmall Sort three Buſhels. When it is ſown in broad Land three Buſhels of the large, and two and a half of the ſmall, is the proper Allowance. In either Caſe this is proportionably a much larger Allowance of Seed, than we recommend on other Occaſions, but the Difference is proper when we conſider the Nature of the Crop.

In moſt other Kinds we depend upon their Produce in the Grain or Seed, therefore a few Plants well nouriſhed is what we ſhould aim at; becauſe theſe will yield a better Crop than a large Number that are ſtarved: but here the Farmer does not form his Expectations of any ſuch Crop. Two Points are to be obtained by the Chiche, firſt the covering and mellowing the Ground; and ſecondly, the ſupplying his Cattle with Food. Now both theſe will be beſt anſwered by the Chiche growing cloſe. If he was to depend upon the Produce in Seed, he ſhould not ſow more than two thirds of this Quantity.

CHAP. XVIII.

Of the Management of Chiches, and their ſtanding for Seed.

WHether it be in Autumn or Spring the Chiche is ſown, it requires no farther Care from the Owner. After it is once harrowed into the Ground, it will riſe quickly, and ſhoot ſtrongly; and being ſown thick it will deſtroy all the Weeds that ſhall attempt to riſe among it. In either Caſe therefore he is to leave the whole to Nature and wait her Progreſs, obſerving the Growth from time to time, to find when it becomes fit for being eaten: and in this he is to conſider alſo the Condition of his Stock, and their other Provender; for he may find it profitable to turn in his Sheep and Lambs a Week or two before he could wiſh, for the Sake of the Chiches, when they would elſe decline for Want of proper Food.

In general the Winter Thetch or Chiche comes in much earlier than the Spring or Summer Kind, but the latter is the beſt and wholeſomeſt Food for Lambs, and is what they always eat the moſt freely.

This does not cover the Ground ſo well as the larger, nor lie upon it ſo cloſely, nor yield ſo large a Crop of Stalks and Leaves; but ſtill there are Advantages. We have ſaid it is beſt for the ſmaller Cattle, and ſhall add what perhaps few have obſerved in its Favour, that it grows up much ſooner after cropping than the other.

In general I have obſerved, that the Winter Thetch ſucceeds beſt on broad Lands, and the ſmall or Summer Kind on Ridges. I name this the more punctually, becauſe in this County (Middlesex) the Cuſtom is the contrary Method in moſt Caſes. The large Thetch is beſt for mowing, and the ſmaller for eating on the Spot: and this is a farther Reaſon why the ſmall ſhould be ſowed preferably on Ridges.

We have already obſerved what neceſſary Differences the Nature of Soils may make in this Article, we ſpeak here of what is beſt when the Choice on that Account is indifferent.

As to the Uſe of Chiches we have ſhewn that the ſtanding for Seed is the leaſt, yet it is needful ſome Seed ſhould be ſaved, and therefore tho' a leſſer Article, ſome Care muſt be taken about it. In this the Farmer, as in all other Matters, ſhould prepare in Time, by properly looking forward.

If he have ſown two Fields with Chiche, that which is drieſt is the moſt proper for letting them ſtand for Seed; if only one, he ſhould ſee which is the drieſt and warmeſt Part of it. In either Caſe he muſt ſet aſide ſuch a Piece as is convenient for Seed, keeping Cattle off it by fencing, or if Horſes by ſtaking them down.

This is what he is to do in the Growth, but he will find his Account in conſidering it at the Time of ſowing.

Let him, when he orders his Field to be plowed up for this Purpoſe, ſhew the Seedſman the Spot he fixes upon for letting his Crop ſtand for Seed, and then order him to ſtrew the Seed there more ſparingly. Half the uſual Quantity will be ſufficient for this Spot, and he will get more Seed, and better than if he allowed the whole. He will ſoon ſee the Difference in the Growth of the Plants; and it will be proper to have this ſmall Part where they are ſet for Seed once weeded.

Theſe are to ſtand undiſturbed till the Seed is thoroughly ripe in the Pods; and then are to be reaped together and threſhed, after a gentle drying.

The Seed thus obtained is to be ſpread upon a Floor and dried. It will be adviſeable for the Owner to exchange this with ſome diſtant Farmer, rather than ſow it again himſelf; but he will ſee by the Look and Condition of his own, when thus carefully dry'd, how the other ought to look when good.

CHAP. XIX.

Of the Manner of feeding with Chiches.

THE proper Part being ſet aſide for Seed, the Farmer is to conſider the reſt as the Food of his Stock, and to contrive in the beſt Manner for the ſpending it among them. The Growth is to determine his Conduct, but in order to manage rightly he muſt always keep in Mind, that there are three Ways of uſing it: firſt, by turning in of Cattle: ſecondly, by cutting it green for them: and thirdly, by making it into Hay. In either Caſe it is a very deſireable and very wholeſome Food.

The Cattle are fondeſt of it when they eat it upon the Ground: it is the moſt profitable when mowed green, and given them in Racks as cut; but it is the moſt wholeſome of all when dried. In this latter State Cattle reliſh it very well, and according to its Condition will prefer it to other Foods. The larger it is the coarſer Hay it makes, the ſmaller the finer and more tender.

For this Reaſon the little Chiche makes the beſt Hay in general; but the large Kind, when not too rank, anſwers very well.

The Huſbandman having theſe ſeveral Uſes in Mind, will manage his Crop accordingly. He will cut it at proper Times and in proper Quantities, and will conſider that the Value depends on the Age and Kind; he will therefore allow the proper Portions for feeding, and at the proper Times, and will take his Opportunities of cutting and drying ſome of the beſt and choiceſt of the Crop, when it is of ſuch a Growth as will render it moſt agreeable to the Cattle.

In this his Conſideration may extend beyond the common Conſideration of the Growth. He may recollect at what Time it will be uſeful to give his Lambs a feeding of the fine young Shoot of the Thetch, and cut ſome of the beſt Parts of the Ground accordingly. The Plants will grow up a great deal quicker when they have been mowed, than when they have been gnawed in eating; and he will have here a Kind of ſecond Spring, wherein there will be tender, delicate, and wholeſome Food for his Lambs, at a Time when he could not have got it in the ſame Condition any where elſe; and when they would not have fed willingly upon the natural large Growth.

When the Chiches have been thus managed, during the Summer, the Owner will find he has made a very good Uſe of his Field in their Product and Uſe, but he is to know the greateſt Advantage is behind; for his Land which was before in ſuch an exhauſted Condition, as to require the Refreſhment of a Fallow, has all the Time it was nouriſhing this uſeful Crop been getting into Heart, and will yield him another Crop of ſome more profitable Kind, without farther Expence or Trouble.

The Condition and Nature of the Field is to direct him what to undertake on this Head, but he has his Choice of Wheat or Turnips in the firſt Place, and if he diſapprove theſe, of almoſt any other Kind.

When a good Piece of Ground has been thus covered with a full Crop of Chiches, it will, by Michaelmas, be ſo mellow and fine, that he may ſow Wheat upon it with great Succeſs.

If he chuſe Turnips they may be ſown with one plowing and well harrowed in, and there will be no Reaſon to fear an early and a profitable Crop.

We have, in a former Part of this Work, mentioned the Principal of the great Corns and Growths among which the Huſbandman may, on this Occaſion, take his Choice; and we ſhall hereafter treat of Coleſeed: there are few Things more profitable than this, under good Management; and it never comes better than after a good Crop of Chiches.

The Winter Chiche we have ſhewn is the moſt profitable, becauſe of its coming in ſo early for a green Food, when there is a Scarcity of other Kinds; and we have obſerved alſo, that it covers the Land the beſt, and does it moſt good; but it is proper we add an Account of what there is againſt it, that the Farmer may not be raſh in determining for it againſt the other on all Occaſions.

The great Diſadvantage of the large or Winter Chiche, is the Uncertainty of the Crop; for it ſometimes periſhes altogether by Froſt. 'Tis no very uncommon Thing to ſee a Crop of it ſtand through the whole Winter, and periſh in February, or even in the firſt Week in March by the Severity of Froſts that come after hot Days.

On the other hand, the Spring ſowing is always ſafe; and as the ſevere Weather in February will often check thoſe Crops of the Michaelmas ſowing, which it does not deſtroy, theſe Spring ſown ones coming up quick, and meeting with no Stop, overtake them.

There is not a better Food for the Horſe than freſh mown Chiches, he will eat them freely, and they take at firſt the common Effect of green Food in a very kindly Manner; after which nothing puts him better in Fleſh.

It is of the ſame Advantage in fattening of horned Cattle; and it is in a particular Manner ſuited to Cows, becauſe it, at the ſame Time that it fattens them up, makes them yield a large Quantity of Milk, and does not give it that ill Flavour which it often gets from the feeding on ſome of the artificial Graſſes.

The Ewes, while they feed on it, have the ſame Advantage, fattening themſelves while they ſupply their Lambs with Abundance of fine and rich Milk.

The Advantages of this Pulſe are not ſufficiently known: it is one of thoſe but newly got into Uſe, and only in ſome Parts of the Kingdom. We ſhall be happy if we can recommend it to the Farmer in ſuch a Manner that it may become univerſal.

CHAP.

CHAP. XX.

Of Lentils.

THE Lentil is another of the ſmall Pulſe Kind, which has not been ſufficiently known in the early Practice of Huſbandry, nor is enough underſtood at preſent. It is a very profitable one, and we ſhall endeavour, for that Reaſon, to render it more univerſal.

The common Language of the Farmers in thoſe Countries where this Pulſe is moſt propagated, is giving it a new Name: they drop half the Word, and commonly call it the Till or Tills.

The Lentil is of the ſame general Kind with the Tare and Chiche, and it more agrees with this laſt than any other, becauſe it has a ſhort Pod: but this is not ſo blown up as that of the Chiche, nor have the Seeds that remarkable Figure we have named in thoſe of the Chiche, by which they reſemble the Head of a Ram.

The Lentil is one of the ſmalleſt of the Pulſe Kind. Its Root is little and inconſiderable, and its Stalks numerous and ſpreading, ſo that it agrees with the Chiche in that it covers the Ground well, and draws very little Nouriſhment from it, ſo that it has the ſame Kind of Benefit in the improving of Land; but this it does in a Manner inferior to the Chiche, becauſe it is ſmaller. We have ſhewn that the large Chiche does this much better than the ſmall Kind; and the Lentil is inferior to both, becauſe it is leſs than either, but yet it has in a proper Degree this Advantage.

The Stalks of the Lentils are a Foot and a half long and weak, the Leaves are compoſed of ſeveral Pairs of ſmall ones, and are of a pale green Colour, they differ from thoſe of the Chiche in that they have no odd one at the End; for there is a Tendril in that Part intended by Nature for the Plant's laying hold of any thing to ſupport itſelf.

The Flowers of the Lentil are little, and naturally rediſh, but they are ſometimes of a deep Purple, and ſometimes white: the Pods are ſmall, and there are uſually only two Seeds in each.

The Lentil, as it is of the ſame Nature with the Chiche, ſo they ſerve the ſame Purpoſes. They may be eaten upon the Ground or in the Rack, and are good either green or dry. They are a very good Food for Horſes, fattening them and keeping them in Health and Strength. Sometimes when eaten too greedily green they throw them into Diſorders, but this may always be prevented by giving them in a proper Manner. The beſt Way of Horſes eating them is dry. They are alſo good for Cows, Sheep, and Hogs; for the former in the Leaf, and for the other when in Fruit. They require no Care after they are in the Ground, and very little Charge in getting them into it, ſo that every thing recommends them: and we hope to ſee them as well known in the moſt remote Parts of the Kingdom ſoon, as they now are where Improvements are more frequent.

CHAP. XXI.

Of the proper Soil for Lentils, and the Manner of ſowing them.

THERE is always an Advantage to the Huſbandman, in having Crops that will grow upon poor Land; and this of the Lentil is one. We have ſeen that the Chiche will thrive upon Ground that has been exhauſted by Corn; but the Lentil will ſucceed on ſuch as is naturally poor, and has been exhauſted into the Bargain.

The Chiche and Tare never do ſo well as in good Garden Mould, but the Lentil thrives upon ſandy, gravelly, or chalky Soils; it is not under that Neceſſity of wet that the Chiche is, but will come to good where there is but the leaſt Fund of Nouriſhment. In the pooreſt, hungrieſt Loams the Lentil yields a good Crop; and never fails to leave that or any other Land in a much better Condition than it was before.

The Land requires little Preparation to fit it for Lentils, and they are to be ſown in Spring. As they are ſmaller they are alſo tenderer than the Chiche, and they muſt not be ſown ſo early. The Middle of March is as proper a Time as can be choſen for this Crop; and the End of that Month, or the Beginning of April, will do very well.

We have ſaid before that this Pulſe is ſo ſmall it does not well cover the Ground, for which Reaſon it does not anſwer the Purpoſe of enriching it like the other Kinds: it may be ſown therefore with Oats or Barley; and will thus anſwer different Purpoſes. Oats and Lentils will grow very well together; and as they will be ripe about the ſame Time, they may be reaped together, and threſhed together, after which they will very eaſily be ſeparated by throwing: the Oats being lighter will fly fartheſt, and the Lentils from their Weight, and their ſmooth round Form, which the Air lays no Hold of, will drop by the Way.

When they are ſown with Barley they may be ſeparated in the ſame Manner; and if a little Care be taken in the throwing, there will be very little farther Trouble.

The Seed Lentils ſhould be plump, ſmooth, and ſhining, for this ſhews they are freſh and ſound: and the Farmer will do well always to exchange Seed with ſome other at a Diſtance, who occupies a ſomewhat different Kind of Land. This being to the mutual Advantage of both there never is any Difficulty. According to the Service for which the Lentil is intended, a different Manner of ſowing will be proper. It is very uſeful to be eaten in the Stalk, but it is alſo worth Regard as to the Seed. In this it is greatly preferable to the Chiche, becauſe the Pods are vaſtly more numerous, and the Seeds are not only produced in greater Quantity, but are much more valuable.

The covering of the Ground being leſs a Conſideration in this Reſpect, gives a new Method of Culture at the Farmer's Diſcretion for this Species, that is, by the Drill and Horſehoeing

Method. The Lentil will thrive excellently on the pooreſt Ground under this Management; but that is not a Reaſon why it ſhould always be preferred; on the contrary, we ſhall adviſe the Farmer, on ſome Occaſions, to prefer the other.

Before he ſows his Ground with this Pulſe, let him conſider what is the principal Uſe whereto he intends to put it. If he deſign it for eating, whether freſh or dry, whether on the Ground or in the Rack, let him by all Means ſow it in the common Way, juſt as we have directed with Reſpect to Chiches; but if he have his Eye principally on the Seed, let him by all Means ſow it by the Drill, and in ſuch Manner that it may be horſehoed.

This naturally infers a great Difference, with Reſpect to the Quantity of Seed.

When Lentils are ſown for feeding in the common Way of Huſbandry, the proper Quantity of Seed is a Buſhel and half to an Acre: if it be intended for Seed, and ſown by the Drill, three Pecks is a very ſufficient Quantity, and the Plants will yield more than if twice as much Seed had been uſed.

In this Caſe the beſt Time for ſowing them is the third Week in March, and they ſhould be ſown in double Rows, with about eight Inches between them, and with ſuch Intervals between Row and Row, that the Horſehoe may conveniently come in.

In this Caſe the Produce will be very great; and this is the beſt Way of ſowing them on poor Land.

CHAP. XXII.

Of the Management and Uſe of Lentils.

THE Lentil, as ſown in the common and Drill Way, requires to be ſpoken of diſtinctly. If it be ſown by Hand, nothing is needful to be done, for it will riſe thick and deſtroy all the Weeds that attempt to riſe among it. When it is ſown by Drill, the Horſehoe muſt go once through the Middle of each Interval, when the firſt Shoot of the Weeds is up; and then no more Trouble is neceſſary. In this latter Caſe, as they are to grow for Seed, no more need be added, but that they are to ſtand till ripe, and then to be reaped dried, by lying in little Heaps in the Field, and then threſhed. But in the other Manner more is to be ſaid about them.

If they be ſown in the common Way, with Oats or Barley, they muſt ſtand their Time, and take their Chance with it; and when ripe muſt be thraſhed together and ſeparated, as we have ſhewn: but when they are ſowed alone, in the common Way of Huſbandry, there requires Care and Conduct in the Management of them.

Some in this Caſe are to be left to ſtand for Seed, but the greater Part is to be eaten upon the Ground, or mowed for that Purpoſe.

Lentils will not grow up after cutting or eating, ſo free as the Chiche, but they afford a good Supply at the cutting. For all Purpoſes the cutting and drying is the beſt Method. The Ox, Cow, and Horſe are very fond of the Lentil cut and dried, and it nouriſhes them greatly, but there is to be a Time obſerved for the cutting, according to the Beaſt that is to be fed with it.

The beſt Time for cutting it for Oxen and Cows, is when the Pods begin to fill; but for Horſes it is beſt when the Lentils are nearly ripe in the Pods. It muſt not be let to ſtand till they are quite ripe, for then the Stalk and Leaves loſe a great deal of their ſtrengthening Quality; but juſt when the Seed is large, and they are not decayed, the Lentil ſerves them both as Hay and Corn.

The Seed is not unworthy the Notice of the Farmer, with Reſpect to his Family, for it is very wholeſome, and not at all unpleaſant.

When Lentils and Barley have grown together, they may be ground together, and will make a very wholeſome and pleaſant Kind of Bread; and being boiled in the Manner of Peaſe, they are eatable, and in the Opinion of many pleaſanter than the beſt Peaſe. They are excellent eaten in the Straw, to make Cows give Abundance of Milk, and they give it no ill Taſte; and there is no Plant whatſoever that better aſſiſts the Ewe for the Suckling of her Lambs.

CHAP. XXIII.

Of Buck-wheat.

AT the End of this Account of the Farmer's leſſer Crops, of theſe ſeveral Kinds, we ſhall add one of a ſingular Nature, and then cloſe the preſent Book, this is Buck-wheat, called in ſome Places Brank; it is very different in Kind from the ſeveral Plants before-named, but it is cultivated in the ſame Manner as an Herb that may yield ſome Profit, and at the ſame Time improves the Ground whereon it grows.

Buck-wheat is an upright and pretty Plant, it grows a Yard high, and has a ſtiff, firm, and round Stalk, which divides toward the Top into ſeveral Branches. The Leaves are broad, they are forked at the End next the Stalk, and pointed at the other, and they are of a pale Green, often yellowiſh. The Flowers ſtand on the Tops of the Branches in large Tufts; they are ſmall and white, and the Seeds follow, which is of a triangular Shape, large and brown on the Outſide, but with a white Kernel within. Each Flower of the Buck-wheat conſiſts of one white little Leaf, divided into five Parts, and has no Cup. Among the Writers on Botany, ſeveral have called this a Cup, and ſaid that the Buck-wheat has no Flower properly ſo called. Within this are eight little reddiſh Lumps, which contain a ſweet Juice, ſuch as there is in moſt Flowers, in greater or leſſer Quantity. Theſe form what is called the Nectarium of the Flower. In the Centre there grow eight ſlender Threads, of the Length of the Flower, with little Buttons at their Ends; among theſe ſtands the Rudiment of the Seed: this is of a three ſquare Form, and has three thready Subſtances growing to it, which are tufted at the Ends: theſe ſerve to catch the Duſt from the little Buttons, on the Tops of the

other Threads for the ripening of the Seed. One Seed follows every Flower, and the Flower itſelf ſerves it as a Covering, growing dry without falling, and clinging round it. This is one Reaſon why it has been called a Cup, rather than a Flower. The Cups of Plants frequently remaining with the Seeds, but the Flowers not.

It is a Native of the Eaſt, and is uſed in ſome Parts of the World for making of Bread. It is called by Writers on theſe Subjects Fagopyrum, and ſometimes Trionum. We meet with this laſt Name in ſome Books of Huſbandry, but the Authors have a very good Reaſon for ſaying little about it, for they do not ſeem to underſtand the Meaning of the Word.

There are two Uſes in the ſowing of this Crop, the one that its Seed is of ſome Value, the other that it will ſerve as a Manure; or as the Farmer's expreſs it, a Lay, whereon to ſow Wheat or Rye; but in this Caſe there is a particular Method to be uſed, for nothing is ſo advantageous, as the plowing it in entire at a proper Growth.

CHAP. XXIV.

Of the Soil for Buck-wheat, and the Manner of ſowing it.

BUck-wheat will grow on the moſt barren Lands, and this is one of its great Uſes to the Farmer. The dryeſt and worſt will afford it Nouriſhment. If he have a Piece of almoſt heathy Land, or of naked Gravel, or in the Stone Countries, one of thoſe Lands where Chips and Fragments of Stone make up, in a Manner, the whole Surface, Buck-wheat will grow on any of them. It requires little Preparation, and needs not be ſown till very late; ſo that every Way it recommends itſelf to his Regard.

When he has fixed upon a Piece of Ground, ſo poor that it will bear nothing elſe; or one that may, by this Means, be rendered fit for ſomething better, his next Thing is to ſeek for good Seed.

He is to chuſe the faireſt and ſoundeſt he can get, ſuch as is dry and of a bright Colour is beſt; but this is in general a Seed in which there is leſs Hazard than moſt others.

The Quantity is to be very different, according to the Deſign of ſowing; for when Buck-wheat is raiſed for Seed, a ſmall Number of Plants well nouriſhed is what the Farmer is to deſire; but when it is ſown only to be plowed in as a Manure, the Seed being not at all concerned in this Matter, the larger a Quantity there is upon the Ground the better.

When Buck-wheat is raiſed for the Seed a Buſhel is ſufficient for an Acre; but on the other hand, when it is meant by Way of Preparation for another Crop, four Buſhels to the Acre is not at all too much. The Time of ſowing Buck-wheat as already obſerved, is later than that of almoſt any other Crop. The Beginning of May is the earlieſt it ſhould be put into the Ground: the Middle of that Month is a better Time, and it will do to the very latter End. Buck-wheat being a Native of very warm Climates, does not bear Cold, and it is ſo quick a Grower that it needs not be ſown early in the Seaſon; for when got into the Ground toward the End of May, it will very well ripen during the Summer Seaſon.

After Buck-wheat is in the Ground there requires no particular Care to be taken of it. The common and familiar Method of plowing and harrowing, and that in the ſlighteſt Manner, covers it, and it will ſhoot at its own Time, let the Weather be what it will: Rain or dry makes very little Difference.

When once cut up it grows apace. The Sort of Grounds allowed to it does not favour the Growth of Weeds, like richer Land, nor do they grow ſo quick upon it; ſo that the Buck-wheat thriving apace, quickly gets the better of them. In this Condition it will continue growing up till it comes to flowering, unleſs the Intent of the Farmer be to plow it in ſooner.

CHAP. XXV.

Of the Management and Uſe of Buck-wheat.

BEſide the two Uſes of Buck-wheat in the Seed, and in plowing into the Ground, it has another very conſiderable one, which is, the being eaten by Cattle. This is the more important, becauſe it comes in at a Time when other Provender is ſcarce, the Graſs being burnt up by the Heat; and the horned Cattle at this Time, toward the End of Summer, being generally in great Want of good freſh Food. The Buck-wheat being then juſt coming into Bloſſom, the Cows are very fond of it; and it is an excellent Nouriſhment, rich and wholeſome, makeing them yield a great Quantity of Milk, and not giving it any diſagreeable Taſte. There is no better Butter or Cheeſe than ſuch as is made of their Milk when they have fed in this Manner.

If the Farmer intends his Crop for this Uſe, he muſt ſow it thicker than for Seed, but not ſo thick as when he intends it for plowing in; two Buſhels and a half of Seed to an Acre will yield a very good Growth for this Purpoſe.

After the Cows have eaten it down, the Stubble may be plowed in, and the Land will do very well for a Crop of Rye. It is not ſo well as when the large full grown Crop, ſown for that Purpoſe, is plowed in entire, that being the beſt Method of making this Crop proper for Wheat.

When this has been the Intent of ſowing, the Crop is to ſtand till full grown and in Flower, but not till the Seed is formed. Juſt before that it is in the richeſt Condition for Manure, and that Opportunity is to be taken.

When the Seed is the Point in View, and the Field has been ſown ſparingly for that Purpoſe, the Plants will be much ſtronger, and they will ripen a great deal.

At this Time the Farmer is to watch when moſt is ripe and none fallen, and then he is to get in his Harveſt.

Buck-

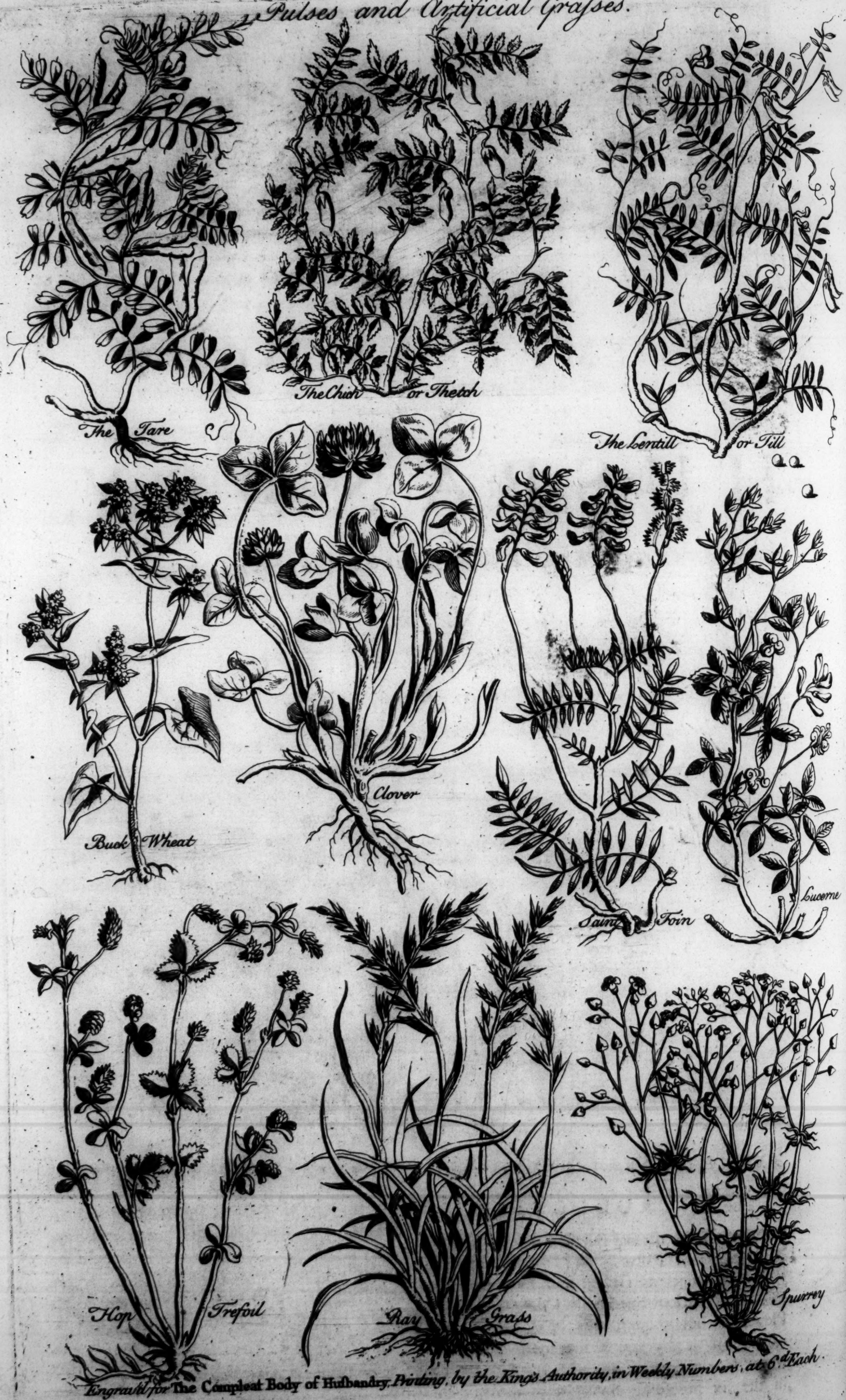
Buck-wheat may ſtand longer than almoſt any Kind of Crop for this Purpoſe, for none holds the Seed ſo firmly. But ſtill there is to be ſome Regard to the Ripeneſs; and when but little is left that can come to good, the whole is to be cut, that more than its Value be not loſt in waiting for it.

The Way of gathering it is by mowing; and when down it is to lie ſome Days in the Air before it is houſed; there is no great Danger of Accidents during this Time, for ſcarce any thing is ſo hardy. When the Stalks are grown limber, and the Grain firm, it is to be carried in and thraſhed. The Produce is very great. Fifty Buſhels for an Acre may be had from very moderate Land, and much more is common from ſuch as is any thing rich.

The Uſes of the Seed are many, it ſerves excellently for Hogs, who are fond of it and fatten very well upon it: many Kinds of Poultry alſo like it; and in ſome Countries it is eaten by the poorer People, made into a Kind of Pancake, with ſome Wheat Flower among it. It is a thriving Food for Horſes. But it ſhould be broke in a Mill before they have it, otherwiſe the Skin is ſo tough it paſſes through them without doing them any good. Cattle will alſo eat the Straw, but it is not nearly ſo nouriſhing as the Grain.

End of the Sixth Book.

Pulses and Artificial Grasses.



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Compleat Body of Husbandry.

BOOK VII.

Of Natural *and* Artificial Grasses.

In TWO PARTS.

The INTRODUCTION.

THE natural Diviſion of the Farm is into Paſture and Tillage, the firſt concerns Graſs, and the other the various Species of Things ſown after Plowing: but though this be generally laſt named, it is by much the moſt important, wherefore we have begun with it, and having in the ſix preceding Books gone through the Conſideration of the Soil, and of its Management various Ways for that Purpoſe, together with the Methods of raiſing the beſt Crops of the ſeveral uſual Kinds; we now come to the other Part which concerns the Graſſes; and after having gone through theſe, which make the ſecond great Conſideration of the Huſbandman, we ſhall deliver the Culture of thoſe Roots which fall in his Way, and of ſeveral Crops of a leſs general Sort.

In treating of the Graſſes, we are led into the Conſideration of two very diſtinct Kinds, tho' from their Uſe blended together; theſe are the Graſs which naturally riſes in the Meadow and Paſture; and thoſe Plants which are ſown in Fields, though from the Purpoſes they ſerve, they are called by the ſame Name.

The firſt Kind may be comprehended under one Term, for its Differences are not great; the other comprehends ſeveral Kinds, Clover, Saintfoine, Lucerne, and others.

The Curious reckon two or three hundred Species or Kinds of common Graſs, but this is a Diſtinction the Huſbandman needs not regard. He will ſee ſome rank and ſome fine, and will diſtinguiſh the Graſs of the low Meadow from that of the up-land Paſture, and both from the ſhort Bite of the Down; and this is all he needs regard.

Theſe ſeveral Species taken together, make what we call common Graſs, or natural Graſs: the others are called artificial Graſſes, a Term we ſhall uſe in Compliance with Cuſtom, tho' not the moſt judicious that might have been choſen.

The natural Graſs is the Produce of our own Country, the Growth of wild Nature, and we have it finer than any other Kingdom in the World: the others are principally of foreign Original; and moſt of them have but newly been brought into Uſe with us.

Natural Graſs will riſe of itſelf, the Wind ſcattering its little Seeds every where, and it is the Covering of our Meadows riſing without Art, or our Aſſiſtance: the artificial Graſſes are to be raiſed by Culture. Land is to be plowed for them as for Crops of Corn, and they are to be ſown with as much Care and Regularity; but, with proper Management, they anſwer the Expence with a very large Return.

We ſhall in that Part of the ſucceeding Book, which treats of the ſeveral Kinds of theſe, lay before the Farmer the Practice of the moſt ingenious, and moſt ſucceſsful in different Places on this Head; and add many Remarks that have not been before made Publick, relating to the Culture of one or two particular Kinds; for there is no Part of the Huſbandman's Profeſſion that more needs to be illuſtrated and explained: but we ſhall lead the Way to this by treating of the common or natural Graſſes firſt, with which every one is acquainted, and wherewith every Farmer muſt have a great deal of Concern.

BOOK VII. PART I.

Of Natural Graſſes.

CHAP. I.

Of the Diviſion of natural Graſs into Meadow and Paſture.

THE Farmer in his Converſation, and Writers in their Books, divide the natural Graſs Grounds into two Kinds, not as differing in the Species, but in the Place of Growth, and the intended Uſe. Theſe they diſtinguiſh by the Names of Meadow and Paſture, and generally underſtand by that Diſtinction, the Graſs intended to be cut for Hay, and that to be eaten on the Ground, but this is an uncertain Manner of ſpeaking. By Meadow ſome expreſs the Graſs of low Grounds only, that lie about Rivers; and by Paſture only ſuch as grows on higher Lands; but both theſe are by the judicious Farmer mowed at Times, and fed at Times, ſo that all that is properly to be underſtood by the two Words is, that being uſed together, they expreſs that Part of the Farmer's Land which is not in Tillage, and they ſhould be uſed together, becauſe this Variation comprehends all Graſs Ground whatſoever, in Diſtinction from all that which is kept in Tilth.

It is a Matter of great Importance to the Farmer, to proportion theſe two Kinds of Ground, the Tillage and Paſturage, one to another. There are many who call themſelves Farmers near London, and about other great Towns, who deal altogether in Paſturage; and this they may do without any Neceſſity of Tillage; but there is no ſuch Thing a Man's keeping his Farm all in Tillage, without Paſture. His Cattle muſt have Food, and his Fields for Corn in the common Way of Huſbandry, require a great deal of Dung for Manure.

This brings on the Neceſſity of keeping up a Proportion between one Kind and the other, for which there is no laying down any general Rule; becauſe, according to the Nature of his Land, and the particular Courſe of Huſbandry he follows, more or leſs Dung may be wanting.

His Experience alone muſt ſhew him this, but he will find it eaſy to make Alterations where it is neceſſary: the laying down a Piece of Corn Land for Graſs, and the taking up a Piece of Graſs Ground for Tilth, being, as we have ſhewn, very eaſy.

There are particular Eſtates alſo that anſwer beſt in various Manners. There are ſome that are ſo rich and proper for Corn, and that lie ſo conveniently for Dung, that a much greater Proportion than the common Method may be kept conveniently and profitably in Tillage; and there are others naturally favourable to Graſs, and that lie where there is a great Demand for it; and in theſe the greater Part ſhould be kept for Paſture.

As we have ſhewn that the Diſtinction into Meadow and Paſture is very little ſettled in its Meaning, we ſhall, to be the better underſtood by all, ſpeak in general of both under the Name of Graſs Ground. The Hay from Graſs Grounds that lie low, and are what is moſt properly called Meadows is generally in larger Quantity than that from ſuch as are higher, but this latter, though there is leſs of it, is ſweeter.

The Abundance of Water that often gets into, or

or upon theſe low Grounds, makes the Graſs rank: and where they lie in the Way of conſtant Wet, they naturally produce very coarſe Kinds of it. We ſee Ruſhes grow in barren and wet Places, and there are a great many Kinds of Graſs, tho' not enough regarded, that more or leſs approach to the ruſhy Kind, which greatly diminiſh the Value of the Hay, that comes from the wetter Sort of theſe Grounds.

The Graſs Grounds that lie high require Aſſiſtances from Manure, but thoſe which are lower, and in the way of flooding, do not; the Overflowing of every River ſo far imitates that of the Nile, that it always leaves a Mud behind it, which ſerves in the Place of Manure, and makes the Graſs ſpring freſh, as if Art had been uſed to recruit the Strength of the Ground.

We have named two Kinds of Graſs Grounds, but there is a third yet to be mentioned, which is ſuch as are within the Reach of Salt Water, whether by the Sides of Rivers, near the Sea, or of the Sea itſelf. Theſe are a great Quantity in one Part or other of the Kingdom, and are capable of being turned to very good Account, their Management therefore is a material Conſideration in a Work intended for general Uſe.

Having premiſed thus much concerning the Nature and Diſtinctions of Graſs Ground in England, we ſhall firſt conſider the three Sorts ſeparately, and afterwards the general and particular Methods of procuring the richeſt Produce from each.

CHAP. II.

Of Graſs Grounds that lie high.

THESE are what the Farmer generally expreſſes by the Term up-land Graſs Grounds; ſome by way of Diſtinction from the lower, call them Paſtures, the other having the Name of Meadow. Theſe up-land Graſs Grounds differ in Situation as they lie upon higher or lower Riſings, or upon their Tops or Sides: they alſo vary greatly in their Soil, which, tho' it be in general different from that of Meadows, yet is alſo very various in Kind between one up-land Ground and another.

With Reſpect to their particular Situation, we muſt firſt obſerve, That as a certain Degree of Expoſure is proper for Graſs, ſo there may be too much; and therefore that thoſe Riſings which are of a moderate Height, are better for Graſs than ſuch as come under the Denomination of high Hills.

The next Difference is, That of their lying on the Top, or on the Side of a Hill; and this is ſo great, that it often trebles the Value in one above the other: nothing is more frequent than for Ground to be wet and boggy on the Top of a Hill, while it is perfectly fine on the Sides all the Way down.

Springs naturally riſe on Hills, and when they are pent in, they break and ſoak through the very Subſtance of the Ground, and convert the whole upper Part of the Surface into a Bog.

On the contrary, the Side of a riſing Ground that has a gradual Deſcent, is, of all Situations that can be named, the beſt for Graſs. In ſuch Ground there generally is Moiſture at the Bottom, which is very eſſential to Graſs; and there is a Way for it to run off, which is equally neceſſary.

Graſs will not thrive without Water, nor can it be good where there is too much; this is the great Article. Where the Tops of Hills that are any Thing high have no Spring, the Bleakneſs of the Expoſure, and the Poorneſs of the Soil, as that is commonly the Caſe, render the Graſs very weak: it is ſweet, but very little of it; and where there are Springs, it is generally boggy. The Way of getting off the Water we have delivered in a preceding Part of this Work, where we treated of Draining; we here ſpeak of the natural Condition.

Now the Side of a Hill having Soil and Moiſture, feeds a rich and good Graſs, without having ſo much wet as to make it rank, or favour the Growth of Ruſhes, or thoſe other bad Kinds of Mixture, which generally depreciate that which grows on the Tops of Hills, or near Rivers.

As to that in Meadows, lying low, is generally a black rich Mould; and nothing more favours the Growth of fine Graſs; but then what theſe Grounds gain in Soil, they loſe by the abundant Moiſture.

The up-land Paſture, of which we treat here, have all that Variety of Soils we ſee in tilled Ground; they are ſometimes gravelly, ſometimes loamy, at others they are ſtony, chalky, or clayey. Of all theſe, the loamy Soil, where there is a good Proportion of rich Earth amongſt it, yields the beſt Graſs; upon Clay, it is apt to be coarſe, becauſe of the Wet it detains; upon Chalk, it is low; upon Gravel, it is ſweet, but thin; the Loam, when of the right Condition, yields it juſt in the middle Way between all theſe, it is plentiful yet ſweet, and affords the fineſt Hay, and the ſweeteſt and richeſt Food for Cattle.

This will direct the Farmer, when he is about to make Changes in the Proportion of his Tillage and Paſture, what to keep for Graſs, and what to break up.

The ſeveral other Soils will afford good Corn by proper Management, and they are eaſily dreſſed when in Tilth; but nothing will anſwer ſo well in Graſs Ground, as the Soil and Situation we have named.

It may be often adviſeable to break up a Piece of Graſs Ground that is on a clayey Soil, becauſe the Clay may be improved by the Additions of Sand with great Eaſe, while in Tilth; but it is not well capable of this while in Paſture. The ſame may be ſaid of the others: they may be eaſily made to yield as good Crops of Corn as the Loam, but nothing in this Situation will afford ſo ſweet Graſs.

I have obſerved in Lincolnshire, that their riſing Grounds have often a Soil exactly like that of their low Meadows, a black rich Earth; but, on examining, there is always too much wet at the Bottom; their Graſs is, however, much finer than that of the low Grounds. In many

many Counties alſo I have obſerved, the Tops of Hills, in general, dry, and their Sides moiſt: in this Caſe the Rule is to be inverted; and it is the Tops that bear the ſweeteſt Graſs.

A Soil that is too clayey, is liable to great Inconveniencies with reſpect to Graſs: in Winter it detains the Wet a long Time, and in Summer it cracks and chaps, and no Earth is more perfectly burnt up.

The black Mould, ſuch as is in the low Grounds, yields Abundance of fine Graſs when it lies dry on the Side of a Hill, but then it is commonly infeſted in a terrible Manner with Worms: the loamy Soils are leſs ſubject to them, and are therefore preferable; ſo that on all Accounts that Preference is due to the rich Loams, which we have given them in Reſpect to the Growth of Graſs: they are not ſubject to poach in Winter, nor to crack or be burnt up in Summer.

Thus let the Farmer judge of the Fitneſs of his Soil for his various Purpoſes, and taking in the whole of the Conſideration, with Reſpect to Graſs, he will now know that a Piece of hanging or ſlanting Ground, with a loamy rich Soil, and a moiſt, but not wet Bottom, is the beſt and fitteſt of all for Paſture; and if he can contrive to bring the Water of ſome Spring occaſionally over it, nothing can add to the Advantage; for ſuch a Piece of Ground, where Water can be let on at Pleaſure, and where it will not lodge, is the moſt ſuited by Nature for Graſs of all others. Such a Piece of Graſs Ground as this will require Manure at Times, but it will very well anſwer the Charge, by the Quantity of the Hay, and Richneſs of the Graſs afterwards, for it will always retain its natural Sweetneſs. The poorer the Soil the oftener theſe up-land Graſs Grounds will require Refreſhment, but, in the worſt of them, this is an Expence always returned with Intereſt.

The Manner of enriching theſe Lands by Manures is a ſeparate Article, and we ſhall treat of it in a ſucceeding Chapter.

CHAP. III.

Of Graſs Grounds that lie low.

THESE comprehend what are commonly called Meadows, Fen, and Marſh Lands. All low Ground is ſubject to overflowing, either in a larger Way by Rivers, or in a ſmaller by the Water coming from the higher Grounds in the Winter Rains; and both theſe Wettings are of great Benefit, if proper Care be taken to carry off the redundant Water; and to prevent the Overflowing by Rivers at improper Times.

The fineſt Part of the Mould is waſhed off by Rains from plowed Lands that lie high, and a Part of the Manure with it, and carried down with the Water to the low Graſs Grounds at their Bottom, this it is that renders them ſo fruitful; and in the ſame Manner Land Floods drowning Meadows by River Sides, have the ſame Effect. The Waters of theſe are thick and yellow, with the richeſt Part of the Soil from the adjoining high Grounds, and they leave this upon thoſe Meadows when they lie upon them to ſettle, and are then taken off. This renders the Graſs on theſe Grounds very plentiful, but as there generally remains too much of the Moiſture behind, it is coarſe; there grow Weeds, and ill Kinds of Graſs in them, which are not in the ſweet Paſturage of the up-lands. There is a great deal of Difference in the Value of thoſe Meadows which are liable to be overflowed by Accident, and thoſe which are capable of being overflowed at Pleaſure, but are out of that Danger. In the firſt, the Water may come at a wrong Time, and often does ſo to the utter Loſs of the Crop: but, in the other, it never can come but when it is brought, and yet 'tis at all thoſe Times, when proper, ready at the Huſbandman's Command.

Such Meadows as lie flat on the Banks of great Rivers, are of the firſt Kind: theſe are ſubject to accidental Floodings, which may come at very wrong Times, and are therefore very precarious and uncertain as to the Produce.

Thoſe which lie near leſſer Streams, and a little higher than the Level of their Waters, are of the latter Kind, they may be overflowed when it will do them good by turning the Stream of the Water upon them; and theſe are worth much more than other low Graſs Grounds for this Reaſon; as the others, from their hazardous Situation, are worthleſs.

To thoſe two we may add a third Kind of Graſs Grounds, which are of a Kind of middle Nature between theſe, and the up-land Paſtures. Theſe laſt are ſuch as lie above the Level of the Water conſiderably, yet not ſo much but that it may be brought over them by Means of Wheels or Engines: theſe are expenſive, but the Benefit is very great. We have not the Spirit of the Italians in this Reſpect, nor indeed the Neceſſity: they raiſe Water to a ſurprizing Height for the overflowing their Paſtures; and they owe all their Verdure to that artificial Management.

The Meadows that lie on the Sides of large Rivers, have all the ſame general Soil, which is a rich dark Mould, they yield Abundance of Graſs; and they owe their Fertility to the Overflowings of thoſe Rivers.

Where they can be ſo managed that the Water can be kept out at proper Times, they are very valuable. This we have treated of in a former Part of this Work; but they can rarely be ſecured.

When Graſs Grounds lie near the Borders of great Rivers, but ſo high as not be flooded accidentally, it will always be worth the Farmer's while to have an Engine for overflowing them at ſuch Times as he ſhall think proper.

A very great Quantity of the Graſs Ground in Lincolnshire, and ſome other Counties, is what they call Fen Land. This is of the Nature of theſe flat Grounds, which lie near great Rivers, and are ſubject to accidental Overflowings, but they are of the worſt Kind, being liable to receive vaſt Quantities of Water, and often having alſo Reſources of their own beſide. Theſe we have ſpoken of in a former Part of our Work, treating of the Manner of banking and draining them;

them; as alſo of the third Kind, which are the Salt Marſhes: theſe are in themſelves poor, and full of the worſt Sorts of Weeds, but by Draining and Banking, as we have there ſhewn, they become excellent Paſtures.

Theſe are the ſeveral Kinds, which, having thus laid before the Reader in one View, we ſhall, in the enſuing Chapters, conſider with Reſpect to their Improvement, and moſt beneficial Management,

CHAP. IV.

Of the Accidents to which Graſs Grounds are liable.

WE have ſhewn what is to be expected from each Kind of Graſs Ground, with reſpect to its Soil, its Situation, and its Degree of Moiſture: we now come to conſider thoſe Accidents to which all Graſs Grounds are liable, and which reduce their Value. Theſe are of three principal Kinds, the firſt being from Weeds, the ſecond from Rubbiſh of any Sort, left on the Ground, and the third from Ant-hills and Mole-hills; theſe laſt are the moſt difficult to be removed, but when Mowing is conſidered, they are of all other Annoyances the moſt obnoxious.

Weeds are of various Kinds, and hurtful in different Degrees. All Plants, not of the Graſs Kind, may be called by this Name, when among Graſs, but ſome are beneficial: the white Trefoil, which is a Sort of Clover; and the red Trefoil, which is a wild Clover, are both ſerviceable, and ſo are ſeveral other little Plants that riſe ſpontaneouſly among the Graſs.

The large Weeds are moſt troubleſome, ſuch as Thiſtles, Docks and Mallows. Theſe are to be grubbed up, or drawn with an Inſtrument made for that Purpoſe, called the Thiſtle Hook. This pierces into the Ground, and laying hold of them at ſome Depth, eaſily pulls the whole Root up.

As to accidental Rubbiſh, this muſt always be picked off. Some will be thrown on by Careleſſneſs, and ſome comes on among the Manure; which, though not ſo eaſily ſeen at firſt, is very plainly to be perceived when the Rains have waſhed the rich Part of the Dung into the Ground.

Women or Boys may be ſent in to gather up this Sort of Stuff, which conſiſts of Bones, Bits of Brick, and broken Glaſs; a little Trouble takes it off, and ſaves a great deal of Difficulty to the Mower.

CHAP. V.

Of Ant-hills and Mole-hills.

THE Weeds being drawn, and Rubbiſh picked off, the Ground will remain in a Condition for the Scythe, if there be not Ants or Moles about it; but theſe Creatures will raiſe Hills that will greatly obſtruct the Buſineſs; and that muſt be removed.

There are ſome who pretend, that in feeding Grounds theſe Hills are of Service, at leaſt not of any Damage, but they err in every Reſpect: there never was an Ant-hill that did not occaſion ſome Miſchief, and where there is one there will ſoon be more, for the Ants will ſpread in a little Time over a large Spot of Ground.

The Loſs by them is evident, becauſe they will cover a great deal of Ground; and they bear but a poor Quantity of Graſs. They not only increaſe in Number, but in Size, when let alone, and ſome have them cut up at laſt that would half fill a Cart. They make the Ground diſagreeable to the Eye, and very unpleaſing to Cattle that feed on it, and have all theſe Inconveniencies yearly increaſing. The prudent Huſbandman weighing this whole Matter, will not follow the Example of thoſe, whoſe Lazyneſs or Ignorance ſuffer them to ſtand, but will reſolve to extirpate them at once, the ſooner he ſets about it the leſs is the Expence; and tho' it grow greater as theſe Hills are more numerous or large, he ſhould not be diſheartened by that, but aſſure himſelf, that the Advantage will be many Times greater than the Charge.

There are ſeveral Methods of deſtroying theſe Hills, and we ſhall give the Huſbandman his Choice of them; but when there is any Quantity of this Work to be done, he will find the Plow we ſhall recommend for that Purpoſe, vaſtly the beſt.

Some order their Servants into the Graſs Grounds in Spring, to cut up theſe Hills by Hand; and where there are not many of them, this may anſwer: it is to be done thus. A thin Shovel is to be made for the Purpoſe, and well edged with Iron; with this the Workman is firſt to cut down through the Ant-hill, beginning at its Top, and preſſing the Shovel down with his Foot: he is then to draw it out, and make another croſs Cut: this ſeparates the Turf and upper Part of the Hill into four Quarters, then are to be thrown back, and then the Earth underneath is to be dug up with the Neſt of the Ants among it. This being done, the four Quarters of the Turf are to be thrown together again, and they will ſoon cloſe and grow.

This is now a Method in ſome Places, and was at one Time practiſed univerſally; but the Diſadvantages attending it are plain: in the firſt Place, here is a diſagreeable Hollow left in the Ground; and then, doubtleſs, ſome of the Ants will remain in the Turf; and having ſo good an Opportunity, they will ſoon multiply, and get to work again; and the Hill will be as big as ever in a little Time: for they are covered by the Turf from the two Accidents moſt pernicious to them, Birds, and ſevere Weather.

But there is another Conſideration behind; which is, the Body of the Ants, with the Earth taken out of the Hole. How to diſpoſe of theſe is no little Difficulty. The old Cuſtom was to break the Clod to Pieces, and ſpread it over the Surface of the Paſture; but this was not deſtroying the Ants, it was only diſperſing them: there was nothing to prevent their getting together again, and accordingly they ſoon did ſo, and the Field was over-run with them.

At preſent the Farmers about LONDON dig them out, and carry them off to their Dunghills, where ſome are deſtroyed, but ſome remain alive, enough to renew the Miſchief. Theſe Hills mix among the Dung, and they are carried with it again upon the Ground, where they breed, multiply, and renew the Miſchief.

One wonders that People who found ſo much Inconveniencies from theſe little Inſects, could content themſelves with ſuch imperfect Methods of remedying it; but ſuch were the beſt known for a long Time, and ſuch are in many Places the only Ways yet uſed.

There cannot be too much Care in the utterly extirpating theſe Creatures, nor in a proper Method of ſetting about it can there be any Difficulty. An excellent Inſtrument for this Purpoſe is the Ant-hill Plow, figured in our ſucceeding Plate; its Structure will be underſtood by any tolerable Workman from the Figure, and we need only caution the Huſbandman, that it be made ſtrong in Proportion to the Service. The Timber Part muſt be Elm or Aſh, and its two Sides about five Inches ſquare; the Iron Part muſt be made thick enough, and be well ſteeled; and it is to be drawn by two or more Horſes lengthwiſe.

This being properly guided, will cut through any Depth of Earth in theſe Hills, and taking them off entire, they may be eaſily removed, and the Surface will be left perfectly even.

When the Edge of the Iron wears, it muſt be carefully repaired, and the Implement always kept in good Order. The Advantage is very great above any other Method, for the few Ants that are left in the Ground, are expoſed to all Kinds of Injuries, and are ſeldom known to be much troubleſome again; and the ſmooth naked Surface being immediately ſown with Hay Seed, preſently becomes uniform with the reſt of the Ground.

The Expence is little, for a tolerable one may be made for a Couple of Guineas, and a very good one, fit for any Service, for Half a Guinea more; and the Price will be ſoon ſaved by the Quantity of Buſineſs done: as many Hills may be cut down with this in a Day, as would take ten or a dozen Labourers a Week.

The Perſon who guides this Plow, will make it cut deeper or ſhallower as he pleaſes, by raiſing or lowering the Handles; and there is nothing it will not make its Way through, with a good Hand to guide, and a proper Force to draw it.

The Buſineſs of the Perſon who guides it is to cut all ſmooth and level with the reſt of the Surface. The Hills being thus cut up, there remains the Care of diſpoſing of them ſo, that they ſhall not afford a Return of the Miſchief. Many Ways have been deviſed for this Purpoſe. It is evident the common Methods of ſpreading them on the Ground, or carrying them to the Dunghill, are extreamly wrong: but we ſhall ſhew the Farmer how he may at the ſame Time be ſure thoroughly to be rid of the Danger of their renewing the Miſchief, and at the ſame Time make an Advantage of them.

In the Uſe of this Plow we have ſaid the bare Space made by cutting up the Hill, is to be ſown immediately; for that Reaſon a Perſon is always to follow the Plow with a Parcel of good Hay Seed in his Pocket; and while he carefully ſows this on the bare Spot, others are to follow and take Care of the Subſtance of the Hills.

Theſe are to lay them in Heaps, which are to be made with Care, not very broad at the Bottom, but high and hollow; and when they have ſtood a little to dry, they muſt be ſet on Fire, and burnt to Aſhes, in the Method we have ſhewn in the Article of burning the Baite.

Where there are but few of the Hills, they may be eaſily piled up in the ſeveral Corners, and waſte Places, and burnt upon the Spot, (which is much the beſt Way) without damaging the Ground; but where there are a great many, as in Places where the Ground is over-run with them, they muſt be carted off the Spot, and burnt in ſome waſte Place, the nearer the better, for the Convenience of carrying back the Aſhes; for, in both Caſes, the Aſhes muſt be carried over the Ground, and ſpread carefully, and they will ſerve as an excellent Manure.

We have obſerved that up-land Paſtures require now and then to be refreſhed with ſome Dreſſing, there is none better than theſe Aſhes; and 'tis in thoſe Paſtures, where they are moſt wanted, that the Hills are moſt frequent. In this Caſe the Graſs will grow every where with an Aſpect of Strength and Freſhneſs; and that on the Places where the Hills ſtood, will ſoon equal the reſt.

There are other Methods of uſing theſe Hills, when they are cut up to Advantage, as a Manure; and the Farmer, according to his Diſcretion, may uſe one or the other. He will find in our Chapters on Manures, which Kind of Dreſſing will be beſt for his Graſs Ground, according to its Situation, and other Accidents; and let him prefer ſuch of the ſeveral we here propoſe to be made from the Hills, as will beſt agree with its Nature.

We have mentioned the burning them to Aſhes, which, on many Occaſions, is the beſt and readieſt Method. A ſecond Way is to carry them all off the Ground, and lay them together to rot perfectly. The Ants will be thus better prevented from a Return, than by throwing in the Hills among a common Dunghill; for, in that Caſe, they ramble about the Heap, ſome Parts of which are dry enough for their Reception: and as it is ſoon carried on to the Ground again, many of them remain there till they go with it, and then increaſe, and make new Hills; but, on the contrary, when the Hills are thrown into a Heap to rot alone, they become very moiſt throughout, ſo that there is no Place for the Ants to live among them, they muſt either leave the Matter, or be ſmothered among it: one Way or other the Ground being cleared of them, and the Manure alſo: there will be no Danger from its going on again. This rotting of the Turf takes Time, and by that Time it is ready for ſpreading, the whole Race of theſe little Vermin will be utterly deſtroyed. It may then be ſpread over the Ground without Danger, and will prove an excellent Method of refreſhing it for a new Crop.

A third Way is to uſe the Hills entire, as they

The Proprietors of this Work having been favoured by an unknown Correſpondent, with this Propoſal for the Improvement of Fences, give it to the Publick in the Author's own Words; with a Plate deſigned by Mr. WALE, *from his Original Drawing, and engraved by Mr.* BOYCE.

A Propoſal for the Improvement of Hedge Fences.

INſtead of cutting the full grown Hedge Wood to the Root, on new fencing an Incloſure, and defending the naked Bank with a dead Stake wreathed Hedge, according to the preſent Practice, this Propoſal is made to introduce the Uſe of a Pollard Hedge.

To illuſtrate the Deſcription of this Fence, Reference muſt be had to the Plate A.

The Structure of the Pollard Fence.

N° 1. Are Stems of the full grown Hedge left ſtanding four Foot high from the Bank, at proper Diſtances; and it would be ſtill an Improvement to have theſe Stems left ſtanding two, three, or more, deep laterally, as well as in the Line of the Hedge.

N° 2. Are the ſame Stems or Pollards interwoven with ſome of the

the Lops of the old Hedge to thicken the Fence.

N° 3 and 4. Are the ſame Stems or Pollards of ſome Years Growth after cutting Pollard wiſe.

The Uſe and Advantage of a Pollard Hedge Fence.

1*ſt*. The Pollard Hedge will yearly grow thicker and ſtronger. Cutting the Hedge to the Root renders the Shrub weak, and ſubject to decay: whereas leaving Pollard Stems with their lateral Branches (which muſt carefully be preſerved) to the Root, gives Vigour and Spirit of Growth to the Plant; and a ſeeming Sollicitude to recover its late Mutilation, by multiplying at every Eye of the Stem, Branch, and Root: this it does ſo profuſely, that in a very few Years the Fence will be as difficult of Acceſs, as a Wall cover'd with Thorns; and at length the Pollard Stems, &*c*. will grow ſo obſtinate, that the Strength of a Horſe will be too weak to make a Breach in this ſtubborn Rampart.

Every Hedge, how weak or ſlender ſoever at preſent, may, with great Eaſe, be nurſed into the moſt ſtubborn Pollard Hedge: but the Farmer muſt avoid lopping it too often, leſt thereby the Pollard Stems fail to increaſe in Bulk.

2*dly*. The Pollard Hedge yields to the Tenant, more Fire Wood than any other Kind. It alſo yields a Fence that will require no Expence to maintain, and demands little or no Wood for Bruſh Stakes or Coping, as are expenſively required in the Caſe of a dead Stake Hedge.

3*dly*. The Pollard Hedge will prove profitable to the Owner, as well as the Occupier of the Land.

At the End of a Leaſe, Fences are generally down, and decayed; and the new Tenant will require them to be repaired at the Owner's Expence. Many Owners have felt the Deduction of a Year's Rent in this Article: let this Intimation therefore be remembered by Land Owners, that it will be profitable to themſelves, and Tenants alſo, to fence their Lands, in their Leaſes, with Pollard Hedges.

they are cut up in Compoſt. The Reader will recollect, that we have recommended the Uſe of a covered Pit for Dung, and other Ingredients, to make Compoſt, and have given a Figure to explain its Structure.

Into ſuch a Pit the whole Hills may be thrown among the Mud of Ditches, freſh Horſe Dung, and the Drainings of the Cow Houſe and Stables; here all is kept ſo moiſt, and in ſuch a State of Fermentation, that it is impoſſible an Ant can live, or any Principle of Life can remain in what are called the Eggs, during the Time of the whole remaining there together: therefore the Addition in Point of Quantity, will be very great, and the whole may be uſed equally for the plowed Land and Graſs Ground, without the leaſt Danger from the Ants in either.

What are called Ants Eggs are the Caſes in which thoſe Creatures remain a Time in Quiet, before their Perfection in the winged State. Reaſon ſhews they cannot be Eggs, becauſe they are bigger than the Bodies which are ſuppoſed to have laid them; and we ſee Bees, Flies, Butterflies, and all other Creatures that have Wings, go through a State of Reſt in this Manner, before they attain their perfect Form.

A fourth Way of uſing theſe Ant-hills with Safety, and to the Advantage of the Ground, is to make them into a Kind of dry Compoſt with Lime, and other Things: this is a very ſafe Method, and is more expeditious than the other: but the Farmer by this Time well knows that different Grounds require various Manures; and he will therefore take whichſoever of theſe Methods beſt ſuits the Nature of his particular Paſture.

The Method of uſing it in Form of the dry Compoſt is this. When the Hills are cut up by the Plow, and carried out of the Field, they are to be thrown on a Heap in ſome waſte Place; and a Quantity of freſh and ſharp Lime being in Readineſs, it is to be ſtrewed pretty thick among them; and ſo managed, as to reach every Part of them.

To this Purpoſe the beſt Method is to ſpread a Parcel of the Ant-hills on the Ground as thick as they can lie, without covering one another; and on theſe to ſtrew a good Quantity of Lime: then to lay over this another Coat of the Ant-hills, and then another ſcattering of Lime, and ſo on, till all the Hills are piled up.

In this Manner let the whole remain ten Days or a Fortnight, and in thar Time the Lime will have taken ſo good Effect, that there will not be an Ant found in the Place. Then let a Quantity of good freſh Dung be laid on the Heap, and from time to time let it be well worked and turned as other Dung is. This Compoſt may be laid upon the Ground from which the Hills were taken, and there will not be the leaſt Danger of their propagating again; and the Benefit, in a tolerable good up-land Paſture, will laſt ſix Years. This I have found by Experience; nor do I know any Manure ſo good, on a proper Soil, as this Mixture of Dung, Lime, and Earth, for Graſs Grounds. The Bodies of the Ants, which are very numerous in the Hills, will alſo, in this Caſe, add a great deal to the Efficacy; for we have ſhewn before, that all Animal Subſtances are full of rich Matter for the Service of Vegetation. This Mixture of Dung and Lime with Pond Mud, is excellent by way of Manure for Graſs Ground; but when the Earth that is uſed for this Purpoſe is thus impregnated with Animal Matter, by being the Reſidence of Millions of theſe Inſects, and full of their Excrements, the Benefit is vaſtly greater.

When the Farmer ſees the Practice of cutting up Ant-hills thus in its full Light, he will be able to count up the Gains riſing from a proper Uſe of the Inſtrument by which it is to be performed, and he will find that in a Courſe of ſix Years Growth of Graſs, the Expence of the Inſtrument, the Labour, and every Thing that can be brought into the Account, will be above forty Times returned to him; and all the while he will have his Paſture lie in a Manner agreeable to his Eye, in a proper Condition for the Mowers, and for the Cattle.

Among the Accidents to which Graſs Grounds are liable, the lodging of Water upon them might be enumerated; and, indeed, as the principal; but that we have treated of already, under the Article of Draining; therefore having gone through the Account of Things which may hurt the Farmer in this Reſpect, we ſhall now proceed to the Improvement of this Part of his Farm, by removing the greater Annoyances, and enriching the Soil.

CHAP. VI.

Of clearing a Paſture Ground from Stumps and Buſhes.

THE Way of drawing Thiſtles, Docks, and the like large Weeds by their Roots, has been laid down among the other Methods of improving a Graſs Ground, by removing the Accidents that hurt it; but we are here to conſider a much greater Annoyance, which is, the frequent Growth of buſhy Stumps, and unprofitable Shrubs. Theſe are not uncommon in many up-land Paſtures, and they are ſuffered in the ſame Manner as Ant-hills, to remain upon the Ground by the Idleneſs or Careleſſneſs of the Farmer, till they reduce the Paſture to the half or third Part of its Value.

I ſhall here ſpeak of what I have very lately ſeen practiſed, partly by many of my own Advice, and partly by the Spirit and Reſolution of the Owner; by which about eighteen Acres of up-land Paſture, have in five Years been rendered of four Times their former Value.

This Paſture was one of thoſe up-land Pieces, of which there are many in Buckinghamshire, and moſt other Counties where the Graſs is but little in Quantity, but very ſweet; and the Ground is over-run in Patches with Broom, Furzes, and Butchers Broom.

Walking with the Owner of this Piece of Ground, who kept it in his own Hands becauſe no-body would give him any Price for it worth naming, I propoſed to him to undertake its Improve-

Improvement. This I told him muſt be ſet about by two Methods at once; the one was, the getting up all theſe Shrubs, and the other, laying on a good deal of rich Manure. Few would have had the Spirit to venture ſo much as he did on this Advice, upon ſo barren a Piece of Ground; but three Years Profit amply returned it to him, and now every Farmer in the Neighbourhood is deſirous of renting the Field. The Method he took for clearing it was this. He had, according to my Directions, an Inſtrument made for tearing all the Shrubs up by their Roots; which, from its Uſe, I ſhall take the Liberty to call an Eradicator. The Invention is not mine, but as old as the Time of GABRIEL PLAT, who has mentioned it in his Diſcovery of hidden Treaſures.

It is a very large and ſtrong three-pronged Fork, which, by the Aſſiſtance of a Block, as a Leaver, is of ſufficient Force to tear up any Thing. The Bigneſs of it is ſo much more than a Dung Fork, which it moſt reſembles, that it ſeems improper to call it by ſuch a Name, wherefore I have given it another. It is to be thus conſtructed. The Handle muſt be a long and thick Beam of Aſh, its Length fifteen or ſixteen Foot, and its Thickneſs ſuch as will keep it firm againſt a great deal of Force. The Tines ſhould be twenty Inches long, notched at the Sides, and a little leaning upwards; and they muſt be joined to a ſtrong Shoulder of Iron, with proper Faſtenings, for the End of the Pole. This being carefully fixed on, the Perſon that works it muſt faſten a Rope of ſix or eight Foot long to the other End, and take with him a thick Block of Wood, and a heavy wooden Beetle.

When he comes to the firſt Shrub of Broom, Furze, or whatſoever; he muſt force in the three Points ſlanting into the Ground, ſo that they go under the Root, and the Top of the Pole be ſomewhat higher than his Head: then with good Strokes of the Beetle, he muſt drive it well in, till the Tines are quite in the Ground: he is then to lay the Block under the Pole, near where the Tines are, this will raiſe its Top ten or twelve Foot high; and he is then to lay hold of the Rope, and pull with all his Force.

Thoſe who know what the Effect of the Lever is, will be ſenſible no Root can keep its Place againſt this: it will tear up the moſt firm; and, in ſome Kinds, will draw out Fibres of ſeven Foot in Length.

When one is up, he is to proceed to the next, and ſo through the Field; throwing them on Heaps as they come up, that they may be ready for carrying off the Ground.

The Field I have been ſpeaking of when we begun this Work, was ſo full of Tufts of Shrubs, that there was not ten Yards of it that could have been mowed, if the Produce had been worth it; and it was very inconvenient even to feeding.

If we had employed Men to grub them up with Pick-axes, as in the common Way, it would have coſt at leaſt twenty Times the Price; and the Ground would have been tore up in a ſtid Manner; and when we had done, ſo many of the broken Roots would have remained, that there would have been preſently a new Parcel of Shrubs upon the Ground; whereas in this Way, the Expence was little or nothing: the Price of the Inſtrument no great Matter, and it will laſt for ever; and the whole Charge of working it, a Couple of Labourers Wages for the few Days that was neceſſary. The Ground was no where broken to ſignify; the Roots, in this Manner of drawing, only cracking the Turf, which fell together as ſoon as they were out; and the biggeſt not ſo much as diſtinguiſhing the Ground for a Foot ſpace, and that moſtly made up again by the falling of the Surface together.

When the Ground was thus cleared, we got together a large Quantity of Manure made of old well rotted Dung, and the Mud of the River; among this we mixed the Bottoms of a Couple of old Hay-ſtacks, which was a rich rotten Earth, full of Graſs Seeds. This being ſpread thick upon the Ground, and waſhed in with the next Rains, the Effect was in a Manner miraculous; from a miſerable barren Place, it became the next Spring very fine Paſture, and is now a prime Piece. The Roots of the old Graſs ſhot freely, having no longer the woody Fibres of the Stumps to intangle with them, and hinder their Progreſs; and the Seed, moſt of it grew ſo, that here was Abundance of Nouriſhment, and a great Number of Plants to draw it.

This is to be done in any Place in the ſame Manner, and the Advantage will be the ſame. PLOT might very well call the Secrets of Huſbandry a hidden Treaſure, for we ſee ſuch of them as he diſcovered expoſed to view; nay, ſuch as the moſt common and popular Writers copied from him, and inſerted in their Books one after another, yet remain unknown or unheeded by the Farmer, who might ſo greatly add to his Profits by their Uſe. This is an Inſtrument no Farmer ought to be without, who has any of this poor, and over-run Paſture Ground upon his Hands; and, by a propet Uſe of it, I am convinced by what I ſaw on this Occaſion, that a great deal of what lies nearly as waſte Ground in this Kingdom, might be made to bear a Price. The beſt Time for doing this is after Harveſt. The Ground will then have Winter to be quiet; and, in Spring, the Shoot will be ſeen ſtrong and fine.

CHAP. VII.

Of improving moſſy Paſture Ground by burning.

IN the laſt Chapter we treated of the Methods of improving Paſture or Graſs Grounds, when over-run with uſeleſs Shrubs: we are here to conſider another Annoyance; which, though leſs conſpicuous, is as pernicious in the Effect; this is, the ſpreading of Moſs, or other low and worthleſs Matter among the proper Growth.

Moſs is a ſculking Enemy to the Farmer in his

his Paſture Grounds, but a very fatal one; the Graſs where this is predominant will appear low and thin, and the Cauſe at firſt perhaps will ſcarce be ſeen, but on examining there will be found, as it were, a Carpet of yellowiſh Moſs ſpread over the Surface of the Ground, through which the few Blades of Graſs have Difficulty to make their Way: as this continues the Miſchief encreaſes, for the Moſs ſending out its Side Branches and young Shoots, thickens more and more, covers the Earth with a deeper and more compact Coat, and makes the Growth of any thing elſe more and more difficult among it.

This is commonly the Fault of Ground that is too damp.

In the ſame Kind of Land, when a little wetter than this, we ſee Tufts of Ruſhes, or of what though leſs conſpicuous, is as miſchievous, a low Kind of Ruſh Graſs; this grows in thick Sods and covers a great Part of the Ground, nothing grows among it, and not much between it. The Sods ſpread and encreaſe from time to time, till at length they will overſpread the whole Piece.

Theſe, as they are the Faults of the ſame Kind of Ground, require the ſame Kind of Remedy; and what we ſhall adviſe in this Caſe, though a very expenſive one, yet is ſo certain of Succeſs, and the Misfortune ſo incapable of being remedied any Way elſe, when grown to an Heighth, that it will always anſwer, and always be found more advantageous than the cheaper and more imperfect Methods. What Graſs there does grow on theſe Grounds is ſmall in Quantity, ſhort, and poor. In dry Paſtures the Graſs is frequently ſhort, but it is ſweet; and where there is little of it, that little is good; but here it is quite otherwiſe, what poor Growth there is, is ſour, and Cattle neither like it nor thrive upon it.

The Way to remedy the Evil is by burning the Rubbiſh with ſome ſmall Parings of the Surface, and ſowing a better Crop.

To this Purpoſe the Turf is to be pared up in the ſame Manner as we have deſcribed for Burnbaiting, and to be ſet up on Heaps, and when dry to be fired.

It is a Sort of Stuff that will take Fire readily, and will preſently burn out. The Aſhes will be a very rich Manure, and the Roots of the Moſs, and other miſchievous Matter will be perfectly deſtroyed.

The beſt Time for doing this is in the Beginning of October. When the Heaps are reduced to Aſhes, theſe are to be ſpread upon the bare Surface and plowed in. The whole muſt be then ſowed thick with Hay Seed, and the Event left to Nature. There will ſoon be a ſhort Green Covering upon the Surface; and this, as it makes no great Shoot upwards during the Winter, will be all that Time ſtrengthening itſelf about the Root. It will thus get into Tufts, and entangle and mat the Fibres together during the Winter, and in Spring it will riſe up, and be a very pretty Paſture.

At the ſame Time that this is done there ſhould be Drains cut through it in two or three Places, to carry off the Water that occaſioned the Dampneſs, and thus the Owner will indeed have a Right to expect a new Kind of Produce, for he will have a Sort of new Land.

In the Choice of the Seed for this Service, there is to be great Care taken it come from Hay that had grown on Land not altogether unlike this, in Reſpect of Moiſture.

We have obſerved before, that the Botaniſts reckon up a great Number of Kinds of Graſs, and have told the Farmer he needs not concern himſelf about their Diſtinctions: this is all he need regard, that as ſome Graſs Grounds are moiſt, and ſome dry, there are certain Kinds of Graſs that grow on the one, and certain other Kinds on the other; and that he is to ſuit his Seed ſo far to his Ground, for that the Seed of the Graſſes that delight moſt in wet Grounds will not ſucceed on ſuch as is dry; and in the ſame Manner the Seeds of Graſs from upland Paſtures will, in a great Meaſure, miſcarry in Meadows. Therefore when Hay Seed is taken for the Purpoſe of ſowing this new recovered Land, it muſt be got from ſuch Hay as has grown on Meadows in low Places, not that of upland Paſtures. This will ſtrike freely and ſpread properly, ſo that there will be no Danger of a good Harveſt of Hay the very firſt Year; and from that Time the Ground will continue encreaſing till the third; after which, if no farther Care were taken, it would decline; but when the Huſbandman is informed of this, he muſt take Precautions accordingly.

We have had Occaſion, in a former Part of this Work, to obſerve, that the Effect of burning the Surface is very great for the Time, and laſts ſome few Years, but afterwards leaves it worſe than it was: this which we there ſhewed to be the Caſe, with Reſpect to Corn on burnt Land, is much the ſame with Graſs, only leſs in the Extream both Ways. The Fertility is not ſo ſurprizingly great, neither is the Effect ſo bad afterwards.

However, as in this Caſe the Ground will grow weak after three Years, Care muſt be taken to renew it by proper Manures before that Time; and the beſt for this Purpoſe are thoſe which are moſt laſting in their Effects.

If there be a proper Kind of Marle in the Neighbourhood, a good Quantity of that ſhould be laid on at the End of two Years, taking Advantage of a dripping Time in October. The fineſt Part of the Marle will ſo be waſhed into the Ground at once; and the harder Lumps will break with the Froſt, and then their Subſtance will waſh in after the ſame Manner.

When there is no Marle, Pond Mud is the beſt Manure; but this never ſucceeds ſo well on theſe Occaſions, as when it is mix'd with rotten Dung, and the Bottoms of old Hay Stacks.

Theſe Methods will keep the Ground in Heart, and the Perſon who has recovered it for himſelf, will leave it in the ſame Condition to his Deſcendants.

CHAP. VIII.

Of improving common Graſs Ground by Manures.

DUNG is an univerſal Manure for Graſs Ground, and the more mellow and rotten it is, the better: moſt People content themſelves with it, and ſeek no farther, but we have ſaid before, that Graſs Ground being of different Soils as well as Corn Land, admits with Advantage the ſame Diverſity of Manures. We ſhall here conſider them in a ſhort Compaſs, having entered at large upon their ſeveral Natures before.

For Graſs Ground of the common Kind, where the Soil is a fat Loam, or a Loam with a very large Quantity of mellow Earth among it, the beſt of all Manure is what we have already named, old Dung and Pond Mud mixed together. This may be conſidered as the general Manure for theſe Grounds; and the Time of laying it on is according to the particular Circumſtances or Uſe the Farmer makes of his Land, from September to February.

The moſt favourable Time of all is in the Middle of Winter, that there may be Froſt to diſſolve and break to Pieces the harder Parts of the Manure, and the Rains may waſh the whole into the Ground at their Leiſure, while there is no great Power of Sun to evaporate the Virtue of it as it lies ſpread on the Ground.

The Way of laying on Manure upon Graſs Ground, is to drop it in ſmall Heaps at due Diſtance; and firſt employing Labourers to break and ſpread it well by Hand, the Owner is afterwards to have it worked over with a Buſh Harrow, which we have deſcribed in a former Part of this Work, but have figured in the ſucceeding Plate, among the other Implements uſed in the Graſs Field.

This Harrow is to be lightly drawn to and fro over the Ground, till the whole Quantity of the Manure be thus torn to Pieces, and ſpread over the Place; it will then be ſoon buried among the riſing Shoots of the Graſs, which will grow up apace from the Effect of its enriching Quality, and what remains will have Time to get thoroughly well into the Ground.

This we have laid down once in the Uſe of the common Manure for a moderate Soil, and ſhall not repeat it as to the others: whatever Dreſſing we order to be laid on Graſs Grounds, this, ſo far as its Nature allows, is the Manner of ſpreading it.

When a Piece of Graſs Ground produces Moſs, and other bad Things, but not in ſuch a Degree as to require the Method of cutting up and burning, the beſt Method is to ſtrew over it twice a Year, namely, in October and in the Beginning of February, a Mixture of two Parts Coal Aſhes and one Part Wood Aſhes, wetted with the emptying the Pots of the Family.

On a Piece of Graſs Ground that is cold, but not very wet, let the Huſbandman ſpread a good Dreſſing of Pigeon's Dung; or of the Dung of Fowls mixed with Earth and Coal Aſhes. This is to be done at the latter End of February, and being the richeſt of all Manures it muſt be ſpread with the greateſt Care and Attention; it will thus come to the Roots of the Graſs, juſt as they are about to make their Shoot, and will cauſe twenty Blades in many Places to grow for one.

There are good Graſs Grounds on the Sort of Soil quite oppoſite to what we have been naming, that is, on ſuch a Loam as having a great Proportion of Sand, and little of the binding Ingredients in it, is hot, looſe, and crumbly. In this Caſe the Manure muſt be varied as the Soil varies; and of all that can be recommended, nothing comes near the Virtue of any one of thoſe clayey Marles we have deſcribed under the Head of Manures; a Dreſſing like this laid on early in Winter, becomes quite broken and mouldered by the Spring, and will all waſh into the Earth, the Conſequence is that it gives the two Qualities wanting Firmneſs and Fatneſs. The Quantity of Hay may very well be doubled by ſuch a Dreſſing, and the Feeding in Proportion; and although this be an expenſive Manure for Graſs Lands in the firſt laying on, yet it very well anſwers in the End; for the Effect, inſtead of three or four, which is the common Duration of Manures, will laſt ten or twelve Years.

There is a hungry, cold, brown Soil, not uncommon in Paſtures, conſiſting of ſome poor loamy Earth, and a little Gravel. On this no Manure anſwers like Chalk: but then it muſt be a proper Kind, otherwiſe there will be Damage inſtead of an Advantage.

There is Chalk as hard as a ſtone, and there are other Kinds as ſoft as Butter. If the firſt ſhould be uſed it would lie like ſo much Rubbiſh on the Surface, and cover one half of the Ground without doing any Good to the other: but if the latter or ſoft Kind of Chalk be choſen, it breaks and diſſolves with the Weather, and waſhes in entirely. November is the proper Seaſon for laying on ſuch a Manure, and the Froſts acting on it firſt, and afterwards the Rains, it will all work in ſo perfectly, that by Lady Day there ſhall not be a Lump as big as a Nut any where ſeen upon the Ground.

In ſome of the up-land Paſtures in Derbyshire and Staffordshire, there is a Kind of brown Earth full of Fragments of Stone. The proper Manure for this is Lime: we have ſhewn in the treating of Corn Land, what a vaſt Effect this Subſtance takes in ſweetening and fertiliſing Land; and it has altogether the ſame in Paſture as in plowed Grounds.

When a Graſs Ground is very ſandy, the Crop muſt of Neceſſity be very thin, but the Graſs will be ſweet: in this Caſe, if there be in the Neighbourhood a ſoft Clay, with a ſmall Mixture of Sand among it, this ſerves as an excellent Manure; for the Sand in the Compoſition will make it break and moulder, which Clay alone would not, and thus it will waſh into the Ground. Thus it will give Firmneſs and a Body to the Soil, which is all this Kind wants, and as to the ſmall Quantity of Sand that gets in along with it, that is only added to the general Maſs, and can do no Harm.

Theſe

Theſe are the ſeveral Manures that ſucceed beſt on the various Kinds of Graſs Grounds; and the Farmer ſees the Soil to which they are ſuited, and what are the beſt Times of laying them on. We need only give him this Caution with Reſpect to them all, that the Expence of them ſhould never deter him from their Uſe, for that the very deareſt always bring a manifold Return.

CHAP. IX.

Of the general Management of Graſs Ground.

THE two Purpoſes to be anſwered by Graſs Ground, whether Meadow or Paſture, are the feeding Cattle at certain Seaſons of the Year, and the affording Hay at others: the Farmer is to have both in his Eye, and to conſider their ſeveral Benefits, that he may know where to borrow from one, for the Advantage of the other, when he knows the Profit will be anſwerable.

The firſt Conſideration is of the Time for feeding, and the Time for laying up for Hay. This varies greatly in different Parts of the Kingdom. The different Situation and Condition of the Ground makes ſome Variation on this Head very natural and very neceſſary; and the Circumſtances of the Farmer, with Reſpect to the Neceſſity of feeding, muſt in ſome Inſtances be allowed to break in upon what is known to be more right.

In Places where they have Plenty of Manure, and make two Crops of Hay, the Cuſtom generally is to lay the Ground for it about the Middle of February. And in this Caſe a little more than three Months gives it a Growth for cutting; ſo that there is Hay by the Middle of May: in other Places they are five Weeks later in laying them for Hay, and the latter End of March is a common Time.

In the Northern Parts of England I have obſerved they are as backward in their Hay-making, as their Corn Harveſt, and they lay their Graſs Lands for Hay accordingly. May Day is, in theſe Places not an uncommon Time.

There is nothing ſo wrong in the Huſbandman's whole Practice, as the defering the laying his Ground for Hay ſo long: it may be convenient to him to feed upon it; but let him conſider what will be the Effect of a hot dry Summer, and what will be the Loſs if he be diſappointed of his Crop. Spring is the Seaſon for the Graſs to make its Shoot; and if it be eaten over and over again at that Time, and hot dry Weather follow, it is deprived of the Benefit of Rains, and never makes that firſt Shoot tolerably, nor comes to any reaſonable Growth afterwards. For theſe Reaſons let the Farmer ſuit his ſeveral Occaſions ſo, as to be ſure of laying down his Ground for the Hay in Time; and if he loſe ſomething in the Advantage of feeding, he may be perfectly aſſured of making himſelf ten-fold Returns for it, in this more profitable Article. We ſhall begin the Management of Graſs Grounds with the Preparation for laying them down, and from thence date the Beginning of the Farmer's Care.

We will ſuppoſe him in the Middle of March, to take off his Cattle from the Grounds where he has good Expectation of Hay, and to prepare for it by making all clean and even.

As ſoon as the Cattle are off let him ſend in Women or Children to finiſh the clearing of the Ground, by picking up the broken Boughs of Trees that the Winter Winds may have thrown in upon the Graſs, and every other Kind of Annoyance: this done let him ſend in a Labourer or more, according to the Compaſs of Ground, and let theſe have Orders to break and ſpread all about, the Dung that may have fallen from the Cattle upon it; and alſo to break and ſcatter any freſh Mole-hills.

This being done, the Expence of which is very little, and the Convenience and Benefit very great, let him order the Ground to be rolled carefully and thoroughly.

The rolling Graſs Grounds intended for mowing is of great Conſequence, as it prepares the Surface for the Scythe, and deſtroys the laſt Accidents that can happen to it during the Preparation for Hay.

In the Winter Months the Surface of the Ground will be rendered here and there unequal, by the treading of Cattle, in ſuch Places as the wet has moſt affected, and where it has lodged moſt: theſe make the Growth of the Graſs ſo far irregular, and therefore are an Injury.

During the firſt Approach of Spring the Worms will be at Work, and will every damp and mild Night throw up Abundance of their Caſts; theſe alſo are like the other, Nuiſances, though not great ones, and they hinder the right and regular Growth of the Graſs: if there be Moles, or if there be any Ants left, they will alſo be at Work at the ſame Time; and this is a Seaſon at which all ſhould be ſet right; and the Condition of the Ground is ſuch that it will eaſily be ſo. The Roller will anſwer the Purpoſe, for it will take more Effect at this Time than at any other.

The Winter's Froſts will have mellowed all theſe broken Parts of the Ground, and the Spring Rains will have ſoftened them, ſo that the Roller will take full Effect upon them. The Rubbiſh of all Kinds has been taken off, and all the old Unevenneſſes taken down, ſo that there can be nothing in the Way hard or different from the general Surface; therefore the Roller will break and cruſh all the little Irregularities there are, and laying the Surface perfectly even, will make Way firſt for a regular Growth of the Graſs, and next for the eaſy cutting of it.

The Roller is to be of Wood, but it muſt be made as true and even in all its Surface, as if cut out of Stone, or caſt in Iron. In general, the heavier it is the better; therefore it ſhould be large. The Trunk of a good ſound thick Elm makes the beſt Roller; but the lower Part muſt be cut away to a Truth, and none of the Bark ſhould be left on the other.

We have ſhewn the Farmer how he is to cut up his Ant-hills. But this is a Practice that will, in a great Meaſure, prevent the Expence and Trouble of that Article. The Spring is the principal Time when theſe little Vermin are at work;

work, and if they be prevented then, they will, in a great Measure, lie ſtill till that Time twelve Month. The rolling with a Roller of proper Weight, cruſhes down and deſtroys their new Work, and kills a great many of them; after which the reſt ſcatter ſo, that there ſeldom is any Miſchief.

There is a farther Uſe in the Rolling of Graſs Ground, of which few are ſenſible; and this is, the preſſing down the Earth about the Roots of the Graſs, and by that Means ſecuring the young Shoots, on which a great Part of the Hay depends, from Accidents by the Variety of the Weather.

We ſee in Gardening that Froſts are moſt fatal to Plants, when the Spring has been ſome Time advanced: the Heat of the Weather making the ſucceeding Cold of the Nights more hurtful. It is the ſame in Reſpect of this young Graſs, and this preſſing down of the Earth prevents it.

In the ſucceeding Months alſo, if there do not fall Rain, the Sun parches up the Roots if the Earth be left looſe about them; but when it is thus preſſed down, they are defended.

This preſſing together of the Earth about the Roots, has alſo another Effect of great Conſequence, in preventing the Lodging of the Graſs: this Accident, which is as miſchievous in a Manner to Graſs as to Corn, happens principally from the Looſeneſs of the Earth about their Roots. When the Graſs or the Corn has ſome Height, the Wind will take Effect upon it, and bear it down; but then if it be well ſupported at the Bottom, it riſes again as ſoon as the Blaſt is over, and there is no Harm done: the Wind rarely breaks the Stalk of Corn, and more ſeldom that of Graſs; ſo that unleſs their Support fails them at the Root, they riſe again. When the Earth is looſe it gives Way, and being preſſed down, they remain down; but when it is firm about their Bottom, no Harm happens: Rolling always gives it this Firmneſs, and therefore prevents that Accident.

When the Roller is brought on the Ground, a careful Perſon is to be employed in managing of it; and it muſt be drawn equally, and ſlowly along. The firſt Care is, that it go over every Part of the Ground; and the next is, that it be drawn leiſurely, for otherwiſe it will not do half its Buſineſs. Whoever will watch the Paſſage of a Garden Roller, over a Gravel Walk when it is a little wet and rough, will ſee plainly this Difference: the ſame Roller, when drawn haſtily over the Walk, ſhall take very little Effect; which, being drawn over it carefully, and ſlowly, will make all level.

In this Manner the Roller is to be drawn over the Paſture or Graſs Ground intended for Hay; and when this has been done, the Farmer has nothing more to do, but to ſee his Fences are ſecure, and leave the Growth to Nature; the Shoots will be numerous and firm, and there will grow a large, and every Way excellent Crop. In low Grounds the Cattle may be ſuffered to feed ſomewhat longer than in the up-lands, unleſs the Seaſon be very wet; ſo that it is ſome Relief to the Farmer. Though he ſhould lay his higher Grounds at the Time we have directed, he will have, in a tolerable Spring, a Fortnight or three Weeks; and, in a very dry one, a Month more for his low Grounds.

In theſe, as well as the others, when they are laid for Hay, let him take Care to have the Ground levelled, and all Rubbiſh picked off; for, when the Mowers come to work, all that Charge will be very well returned. There will be none of thoſe Stops and Stayings that there are, and always muſt be when there are Hillocks, and other Impediments in the Way; and the Mowers will be able not only to go on with their Work regularly, but to come an Inch or two cloſer to the Ground; and this is a very great Concern. The Farmers have a very juſt Obſervation, that one Inch of Hay at the Bottom is worth three at the Top, and they have Reaſon: nor is the Aftermath at all the worſe for this cloſe Cutting. That does not depend upon the Stumps of the old Graſs that are left, but upon the new Shoots made from the Root; and the cloſer thoſe are cut, the more free that Shoot comes, ſo that the cloſe Mowing is every Way an Advantage.

CHAP. X.

Of Mowing.

THE Ground being thus carefully laid for Hay, the Farmer has no farther Care but the knowing when to cut it. This he muſt carefully obſerve, for there is a proper Time of Ripeneſs; and all after, as well as all before that, is ſo much Loſs.

When a Piece of Ground is laid early, and has been properly aſſiſted by Manures, it will often be ready to cut in the End of May.

There are thoſe, who, in a forward Seaſon, cut it earlier, taking the firſt Appearance of Ripeneſs, imagining they are ſecuring their Intereſt, by preparing early for a ſecond Crop; but they often loſe more in the firſt, than it is poſſible they ſhould get in the latter. The firſt Crop of Hay is the great Article, and ſhould be regarded accordingly: the other is always trifling in Compariſon.

There is a Time of the Year when every Plant flowers; and Graſs, like others, has its Seaſon. If we examine in other Plants the Courſe of Nature, we ſhall ſee that though their Leaves ſtand pretty well during the flowering, they wither when they come to ripen the Seed. The Leaves of Graſs go to the Quantity of Hay as well as the Stalks; and are indeed the beſt Part; they are not therefore to be neglected for the Sake of the other. The ſeveral common Kinds of Graſs, in well managed Paſtures, get into Flower in the End of May, or Beginning of June, this therefore is the natural and proper Seaſon for cutting of them. The Hay will not have its due Quantity till the Stalks are full grown; but after that Time, the Leaves will fall ſo faſt into a State of Decay, that there will be more loſt by twenty Times at the Bottom, than there is gained at the Top. The Price of Hay is

very conſiderable, but that depends upon its Goodneſs; and this upon two Articles, the Time of cutting, and the Manner of making; and upon the former little leſs than on the latter.

The Faults in making are moſt obvious, but there may be poor Hay got from a very good Piece of Ground, either before, or after the right Seaſon of Mowing; while that which is truly excellent can be had only by ſeizing the right Time.

The fine green Colour of Hay is very much valued. This is owing, in a great Meaſure, to the making; but then it muſt be in the Graſs itſelf, otherwiſe all the Care that can be taken in drying it, is all in vain: a proper Method of Turning will preſerve a Colour, but it cannot give it: that muſt be from Nature.

This fine Colour depends, like the reſt of the good Qualities, on the Time of Mowing, or the Degree of Ripeneſs of the Graſs. When it is juſt in Flower, the Leaves are freſh and green; but when it is got to Seed, they grow brown: this is the firſt Step toward their Decay, and this is the Change of Colour which no Art can recover.

While the Graſs is but coming to Perfection, it is too green; when it has ſtood too long, it becomes brown; and that fine pale green Colour ſo eſteemed in Hay, can never be obtained by any Art afterwards.

The Smell of Hay is another Article of its Value, and this, like the reſt, muſt be preſerved by Care in the making, but it muſt be entirely owing to the Time of cutting.

Hay that has ſtood too long, has the Appearance of ſo much Stubble, and has no more Smell; whereas at the Time of the Graſs flowering, which is its juſt State of Perfection, there is one of the pleaſanteſt Flavours we know, from the cutting through of the Stalk, and the evaporating of its Juice in drying. The Colour of the Stalk fades as well as that of the Leaves, after the due Seaſon is over; and we ſhall ſee this plain enough, if toward Autumn we look upon ſuch Graſs as has run up among Buſhes, out of the Reach of the Scythe and Cattle. The Stalks of this were at one Time in a Condition to make the fineſt Hay, but after that we ſee them dry, brown ſticks, and without Taſte, Smell, or any other Quality.

The whole depends upon this Principle before eſtabliſhed, there is a State of Perfection in all Vegetables, and the Art of the Huſbandman muſt be employed to obſerve, and his Prudence to ſeize it. This State of Perfection with reſpect to an entire Plant, is juſt the Time of its flowering. When we mean to ſave the Seeds of any Thing, we muſt ſtay longer; and, in that Caſe, we ſee the Plant wither; but the Time of its Perfection is juſt the coming into Flower. The Apothecary buys his Herbs for Diſtilling at that Period, knowing that juſt when the Flowers are opening, the Stalks, Leaves, and every Part are the fulleſt of Virtue: and it is ſo in Graſs. The Farmer muſt make the ſame careful Obſervation, and the ſame Choice.

Now that we have given the Reaſons for chuſing Graſs at ſuch a Period for Mowing, it is proper to deliver the Marks by which it is known to be ſo. Let the Farmer to this End take in the Examination of the whole Plant. It may be ſeen by the Heads alone, but as the Effect of their ripening ſhews itſelf at the Bottom alſo, let him take in both.

Thus let him go into his Graſs Fields from time to time toward the End of May, and during the Beginning of June, if not prevented ſooner by the full Ripeneſs. Let him examine the Stalks which will be now grown up in Height, and ſee how their Tops approach toward Ripeneſs; he will perceive from time to time the little Heads ſwell, and at length there will appear a few white Threads. Theſe, in ſome Kinds of Graſs, only ſhew themſelves on the Surface of the Buttons; and, in others, hang from them a fifth Part of an Inch. This is the Flower of the Graſs, and when it appears, the Hay Time is near.

He muſt not judge from one or two Plants in a Hundred, but ſee when the whole Field thus gets into Bloom; and then he muſt be critical in his Examination. The fuller and freſher it is at the Top, while the Bottom remains perfectly ſound and good, the better; therefore that is to be examined for the final marking of the Time. Let the Farmer open the Graſs with his Hands in ſeveral Places, down to the Ground, and obſerve carefully how the lower Part looks: as theſe flowery Parts, or the Top ripen, the Bottom will grow brown. This is the firſt Mark of its Decay. After this the Top will get nothing; and the Bottom will loſe a great deal, ſo this is the Time for the Mowing.

The Mowers are to be ſent in, and the Ground having been thus prepared and levelled for them, they have no Excuſe if they do not cut it cloſe. Theſe are a Sort of People, as every one knows who has had any Concerns with them, who are very apt to ſlight over their Work, and ready to ſeize upon any Pretence for doing ſo: they have no Conſideration that their Careleſſneſs is the Loſs to the Farmer, perhaps of a tenth Part of his Crop: but let him take Care of it himſelf: as he has according to theſe Directions prepared the Ground for them, let him follow them, and frequently put them in mind of it: they will thus be brought to do much better than they ever will when left to themſelves; and the Addition to the Quantity of the Hay will very well pay the Farmer for his Care and Attendance.

We commonly ſee the Farmers about London, riding in their Grounds among their Haymakers, but this is an idle Cuſtom: let them walk after their Mowers, and they will do themſelves twenty Times the Service.

The Buſineſs of Hay-making is generally done much better than that of Mowing; and if any Omiſſion be made in it, 'tis eaſily ſeen, and there is Time to rectify it; but in the Mowing, the Miſchief is ſcarce to be ſeen, unleſs the Scythe be followed; and when it is once done, there is no mending it. The Graſs being down, is to be carefully dried; and in this there is ſo much Difference between the Practice of the Farmers in the Parts of the Kingdom where

Husbandry is most improved, and the others, that it should be set in the strongest Light, to render those Improvements universal.

CHAP. XI.

Of Hay-making.

THE Grass being down, is to be turned and dried, and then it is Hay. This is the whole Process in a few Words, but there must go more to the well understanding of it.

We have directed the Farmer to cut down his Grass at a Time when it has a full Body, and a fine Colour; and we shall now shew the Methods by which it may be preserved, and the Neglects by which in many Places it is lost.

In the less improved Parts of the Kingdom, the Hay-making Season comes very late. They allow little Manure to the Grounds, they lay them up late; and, consequently, in the most favourable Summers they have but a poor Crop of Hay, compared with those who take better Measures; and in hot and dry Seasons, they have scarce any.

In these Places the Farmer never thinks of cutting his Grass till it begins to look brown at the Top, which indeed it does sooner than it would if better supplied with Nourishment; and then it is failing at the Bottom.

At this Time he sends in the Mowers, who cannot cut close because of the Unevenness of the Ground; nor does he insist upon it, for he imagines that the more they leave, the better will be his Aftermath. The Error of all this we have shewn, that it may be practised no longer; but we are very sensible that it is too common in a great Part of the Kingdom at present. When the Grass is thus cut, it has neither a good Colour, nor good Smell; so that no Art or Management could make fine Hay out of it; but if that could, it has not the Chance, for the Hay-making is as little understood as the Mowing.

They let it lie in the Swarth, and think they do enough if they turn it two or three Times in the Sun, never putting it into Cocks, till they suppose it nearly made; they then put it up in large Cocks, and let it stand a Week or ten Days to sweat, and then take it home, and put it up in a great Rick, the Labourers riding in Triumph in the Cart, as if they had done their Business notably.

Many have wondered at the Difference between the Hay about London, and that in remote Parts of the Kingdom: it is indeed extreamly great; but none will be surprized at it who sees this Reason. The whole Management is bad there; and, in general, good in every Part here. We shall lay down the best Method in a few Words, and hope the improved Farmer will find his own Practice agree with it, and that others will mend by following of it.

The great Care in this Point, is to preserve the Colour. The Grass being cut in the Condition we have named, will be of a fine green, and this is to be preserved; for the Farmer may be assured, that a Loss of Colour is always attended with a Loss of Taste, and Loss of Smell; and with a certain Loss in the Article of Price.

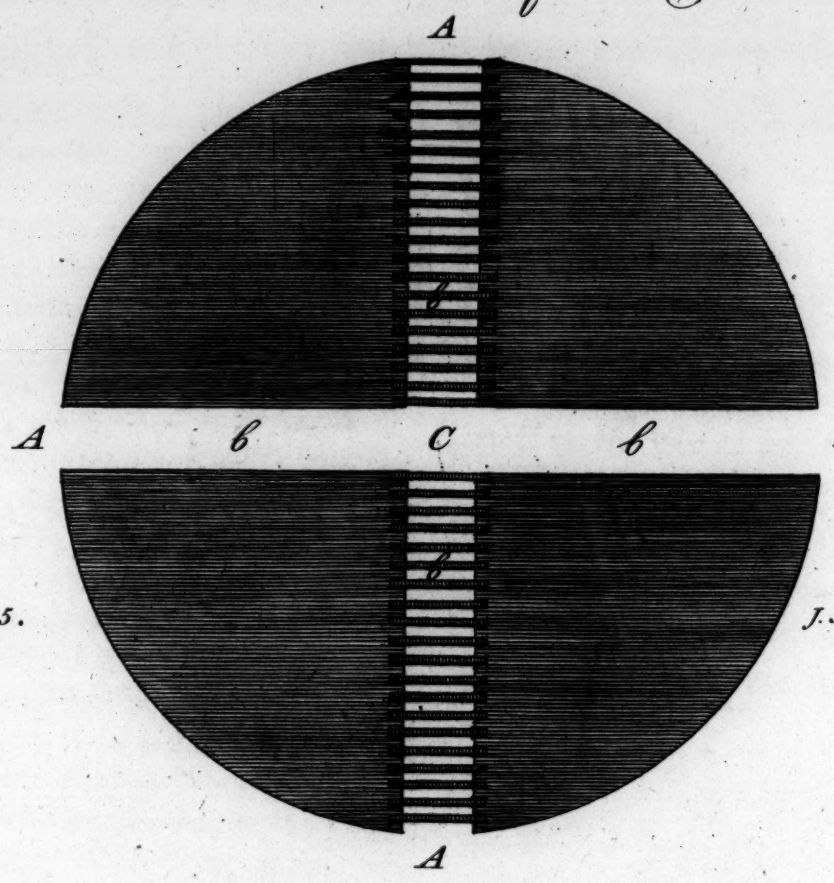
To preserve the Colour of the Grass, and give it the full Sweetness when it is mowed, it should be let to lie in the Swarth two Days and a half. At the End of this Time it is to be spread out, this is properly what is called tedding of the Hay; and thus it is to lie exposed to the Sun during the Remainder of the Day. Then it is to be made up into little Cocks, which are called Grass Cocks, at Evening, and so left for the Night. The next Morning, as soon as the Dew is off the Ground, these Grass Cocks are to be spread, and thus the Side of the Grass that had lain undermost, will get dried. In this Condition it lies all that Day. Toward Evening, it is to be cocked up again into the same Sort of little Grass Cocks as before.

This is a reasonable, and excellent Practice, for it at the same Time gives the Hay all the Advantage of the Air and Sun during the Day, and defends it from the Dews of the Night, which can do little Harm when it is gathered up in these Heaps; though while it lay spread upon the Ground, they would have greatly interfered with the Drying. I have seen when this Caution of cocking up at Evening has been omitted, that the whole Quantity which was very forward in drying the Day before, has been rendered damp and soft, and brought into a worse Condition than at first; for the Water of the Dew is more hurtful to its Colour than the natural Juices of the Grass. In this Condition the Smell and Colour have been greatly impaired, and there has been afterwards no Way of recovering them. This is not so bad as the Practice of the remote Farmers, whose Hay is always brown, and Mow-burnt; but it is very much inferior to the true and careful Method, and never fails to reduce the Price.

In the proper Method of Hay-making after the Tedding, and Grass Cocking, so far as we have named, the Hay is to be spread again, and drawn up into a Kind of Lengths, which they call Windrows. This is a very good Condition for drying, and what is a great Advantage also, these Windrows are easily thrown up into Cocks, for they lie conveniently for that Purpose: thus when the Weather is fine, the Hay has the full Advantage of it, as it lies spread out in these Rows; and if Rain come on, the Hay-makers can toss it into Cocks in a few Minutes, in which Condition it will get very little Damage, and is ready to be spread again to take the Advantage of the next fair Blast.

From these Windrows the Hay is to be thrown into large Cocks, and in these to stand through the Night, and for some Time afterwards; but then it is not, though pretty well made, to be carried home directly from the Field in this Condition. The Outside of one of these large Cocks will be very dry, while there is Moisture in the Middle, and the Farmer's Business is to have his Hay all alike; not only some of the Juices of the Grass will remain in that which has been in the innermost Part of the Cock, but it will sweat a little with lying together: therefore these Cocks must be thrown

PLAN of a FOUNDATION proposed for STACKING HAY upon, to prevent its Firing, tho put up with more Sap in it, or in a greener Condition than Ordinary: One Stone of such Hay having more Nourishment in it than two or three of the Common Sort.



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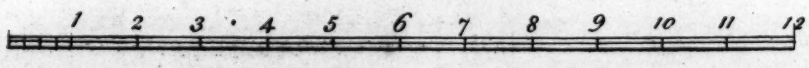
J. Mynde sculp.

A Scale of Feet.



A,A,A,A,... The Circumference of the Foundation, laid with dry Stones or Brick, & raised only one foot above the Surface of the Ground.

b, b, b, b..... Four Cross Gutters, each one foot Square in the Bore, meeting in the middle of the Foundation, to be all covered over with loose pieces of Wood or Stone as one of them is in the Plan for Example.

C,..... In the Center of Communication to all the four Gutters, place a Common Sack Upright with a round Bottom, stuffed with Straw, & as the Cock raises, draw up the Sack a foot or two, till it be quite finished a top; then draw out the Sack, & leave its Track open a top as a Vent to the perpendicular Flue, till the danger of overheating be over, when it may be covered over & Thatched.

This greenish Hay begining to heat, soon rarifies & expands the Air contained in the perpendicular Flue, which is continually expelled a top, and succeeded by the Indraft of the cool dense Air from the Gutters below so long as the least heat remains in the Cock, which will prevent firing overheating & Mow-burning over much, especially if it be considered that no part of this Cock is distant above three foot from the ambient Air without or the Circulation thereof in the Center Flue.

When the Cock is cured Thatched & quite cooled, the Gutters should all be stoped on the Outsides with Wisps of Straw, or the Hay will not keep so long & well as it might do; But if intended to be used in 3 or 4 Months after Stacking, keep the Gutters open the whole time, but the flue a top must always be closed in at Thatching time.

Engravid for the Compleate Body of Husbandry. Printing by the King's Authority in Weekly Numbers at 6.d. each.

thrown to Pieces, and the whole Quantity of the Hay once more ſpread upon the Ground. If good Weather follow, it will thus dry in a very compleat and perfect Manner: three Hours Wind and Sun going farther under theſe Circumſtances than a Day at another Time.

If the Weather continue favourable, the Buſineſs of Hay-making is thus happily finiſhed; but if Rain come, we muſt give the Farmer his Leſſon, which is, not to turn the Hay that has catched the Wet as it lay ſpread, but to let it dry as it lies, which, theſe Showers being ſeldom laſting, it will quickly do. On the contrary, if the over Care of the Hay-makers ſhould turn the Graſs thus nearly dried, and then wetted by Accident to the Ground, the Damp of the Earth would greatly injure it. On the other Hand, as the Wet is ſlight, and the Sun and Air have great Power; the Top will preſently dry again lying as it is.

After this ſpreading from the Cocks, the Hay may be thrown together for Convenience of Loading, and is in perfect good Condition to carry in.

This is the whole Method of Hay-making, when every Thing has been properly managed; but, in other Caſes, farther Care may be neceſſary; and we ſhall be defective, if we do not inform the Farmer in all poſſible Particulars.

We have directed him in preparing his Ground at the Approach of Winter, or, in the worſt Caſe, early in the Spring to get up all large Weeds: and we have directed him in the Article of Hay-making, for a clean Piece of Graſs Ground thus prepared. On the other Hand, when this due and timely Care has been neglected, more Time, and greater Caution will be required in the making of the Hay. When there are thick Weeds among the Graſs, there muſt be more Time to dry the Whole than where the Graſs is clean, for theſe have more Moiſture, and are, conſequently, longer in parting with it. And if the Hay be put up damp with them among it, there is no End of the Miſchief, for they will give afterwards, and ſpoil every Thing near them.

In whatever Condition the Graſs be, the more Hands are employed in making the Hay, the better; and a very careful Eye muſt be kept over them, to ſee they do their Duty.

CHAP. XII.

Of the Aftermath, and the Winter Uſe of Graſs Grounds.

WE have conducted the Farmer from the clearing and preparing his Ground, to the making and carrying Home of his Hay; and we are now to ſuppoſe the Ground cleared, and to conſider the Uſe it may be put to, during the remaining Part of the Year.

The Hay of the firſt or great Crop being carefully ricked, that Trouble will be entirely off his Hands. If the Weather be favourable, his Intereſt is to keep it till perfectly dry upon the Ground; but if it be precarious, he may ſtack it ſooner, obſerving the Caution we have given in one of our firſt Numbers of this Work, to keep a Hollow in the Centre of the Stack to prevent its heating.

In either Caſe the Hay being out of Hand, his Care is to return to the Ground from whence it was cut, and make the beſt Advantage of this he can.

In the more improved Counties where the firſt Crop comes early, they expect a ſecond; and keep the Ground as carefully for this as for the firſt.

We have ſhewn it is an Error to ſuppoſe the old Stumps grow up into a new Crop, therefore that the cloſer the firſt is cut the better. This will, to the common Reader, ſeem againſt Reaſon, but we can aſſure him it is the Doctrine of Experience. If he will obſerve two Graſs Grounds, the one of which has been cut cloſe; and the other in a more careleſs Manner, with long uneven Stumps left on it, he will find the cloſe cut Piece will yield the new Shoot quickeſt, and will keep above the other in Height throughout the Growth.

This is to make the ſecond Crop of Hay: but, at the beſt, that is much inferior to the former; and, upon the Whole, the Huſbandman is often in the Wrong to depend upon it.

None but good Ground, and what is kept very well in Heart, will afford a ſecond Crop at all worth cutting; and even this not well, unleſs the Weather favours. At the beſt therefore, the Profit is but moderate, and the Hazard very conſiderable; ſo that in many Caſes, it is better to uſe the Ground for feeding.

The Farmer who lives in a County where Manure is ſcarce, and where there is not all this nice and exact Care uſed about Graſs Grounds, muſt not expect all the Advantages we name, to him who uſes more Art, and more Expence in his Improvements. Thus, as it is not every Ground in the moſt improved Counties that will yield a ſecond Crop of Hay to Advantage, ſo in the leſs improved Grounds, the Huſbandman is not to expect one Crop every Year.

The Crop of Hay from the Graſs Grounds, is like that of Corn on the plowed Land, it is the utmoſt the Soil is able to produce, and it exhauſts it accordingly. Therefore as in the Counties where leſs Improvement by Manure is uſed, a Fallow once in three Years is allowed to recover the Heart of the Ground; in the ſame Manner in ſuch Places, the Crop of Hay ſhould be once in three Years ſpared to give Strength for the others.

There is ſome Advantage however in this, which may be called the Year of Fallow for the Graſs, in that it is not altogether uſeleſs; for, though the Graſs is not to be mown that Year for Hay, it may be eaten by the Cattle. There will be the more upon it for them, becauſe the Heart is not ſuffered to run up to Head for Hay: and all the while their Dung as they feed upon the Ground, will be enriching and improving it.

This Matter of the Graſs gathering Strength in the Year wherein there is no Mowing, will be perfectly underſtood by what we have before ſaid of the Growth of Plants in general; which is in all of them thus. The Root ſupplies the

Leaves

Leaves with abundant Nouriſhment, while there is no Stalk. When that Stalk grows it demands a great deal, the Leaves therefore have leſs; and when the Seed comes toward ripening, all the Care of Nature is directed thither, that being the Intent in the Growth of the Plant.

Now this ſhews very plainly the Advantage of the Year of Fallow, as it may be called, to Graſs Grounds, that is, the Year in which they are fed, not mowed. The Growth of the Graſs into Stalk exhauſts the Root, and ſtarves the Leaves. This is what is ſuffered in the Hay Seaſon, and it is therefore the Hay Crop exhauſts the Land ſo much more than the feeding.

When a Piece of Graſs Ground is kept a whole Year for feeding alone, the Stalks are eaten off as they would riſe, and the Leaves being alſo conſtantly cropped, new ones are continually ſent up in their Places; which being again eaten down before they are of a Size to exhauſt the Roots too much, the whole Plant is kept in a Condition of conſtant Vigour, and the Roots in Strength and Heart. The Ground alſo is leſs exhauſted by the Growth, and all the Time refreſhed by the Dung, ſo that there is every Way Improvement.

In this Manner the Year of Fallow is to be conducted in thoſe Counties, where the Want of Improvement renders it neceſſary: with us the Aftermath is to riſe to a new Crop for mowing, or to be eaten on the Ground, according to the Circumſtances and Occaſions of the Farmer.

In the eating it off, the larger Cattle are to be let on firſt, and Sheep afterwards. They will eat where the Oxen and Cows can find nothing more; and when the Ground is fed down in this Manner, it is to lie a few Weeks to recover, and then the Cattle are to be turned in again. This, with the Manuring and Dreſſing as we have directed, compriſes the whole Management of Paſturage.

BOOK VII. PART II.

Of the Cultivation of artificial Graſſes.

CHAP. XIII.

Of artificial Graſſes in general.

WE have obſerved already, that theſe are principally of foreign Origin, and all of them are to be ſown and raiſed by Culture, none growing naturally wild in whole Fields, as the common Graſs does, which is therefore called natural, in Diſtinction from theſe raiſed by Art and Culture.

As theſe ſeveral Kinds are moſtly of foreign Extraction, the Method of Culture is alſo copied from Abroad, but we have greatly improved it. 'Tis the Character of the English to receive and adopt the Productions of other Countries, and to make them our own by our Improvements. We have in no Article done it more than in this of the foreign Graſſes; the Seeds of which we have from Abroad, and raiſe artificially here, whence their common Name.

There are often Reaſons why it may be proper to take a Piece of Ground out of Corn, and ſow it with ſome of the Graſſes. This uſed to be done in the old Huſbandry, with the common Graſs Seed, but at preſent the Cuſtom is by ſome of theſe Kinds, and the Profit four, five, or more Times greater.

There are the greateſt Reaſons for varying a Crop from time to time. And theſe anſwer excellently for that Purpoſe, giving the Land an advantageous Kind of Fallow, while they at the ſame Time afford a very profitable Produce.

The Huſbandman ſees often the Advantage of ſowing Corn or Pulſe, where Graſs would hardly grow, but this is raiſed at an Expence of Manure and Tillage, and laſts no longer than one Seaſon: theſe Graſſes will in the ſame Manner grow, with proper Management, on ſuch Ground as will not bear common Graſs; and they will alſo follow Corn when it has quite exhauſted the Land, very ſucceſsfully.

The Reaſon of this we have given before, which is, that Corn rooting very ſlightly, can exhauſt only the ſuperficial Part of the Soil, ſo that theſe which go deeper find Nouriſhment: and at the ſame Time fallow and improve the upper Part, which will be wanted for Corn again.

We have ſhewn that the Pulſe Kind all are Improvers of Land by this Means; by ſhading the Surface and mellowing it, while they draw but little Nouriſhment from it; but theſe Graſſes do much better, they cover the Surface more cloſely, ſo that there is more Advantage to the Ground, and they penetrate deep for their Nouriſhment. They differ from Pulſe in this, that they require a great deal of Food, but then they take it from ſuch Part of the Ground as is not called upon for Culture.

Every thing that enriches Land acts upon one of theſe two Principles, as Manure or as Fallow. The Manures give a Fertility from themſelves. The Fallow leaves the Ground open to receive it from the Air: but it will even get it any where ſo it have Reſt.

We ſee in Gardening that when much Manure is not uſed, the Ground is to be trenched once in two or three Years, to make it fruitful. This trenching is changing that Part on which Plants ſtood, and from which they received Nouriſhment. They dig to a Depth ſufficient to raiſe a new Parcel of Mould, and they bury the former Surface in the Hollow from whence they throw up

up that. In the ſame Manner theſe Graſſes act, though under a different Form, and indeed every Way more ſucceſsfully. In that Caſe the ſuperficial Earth wherein the former Crop grew, is thrown under the new Surface, where it gathers freſh Strength, and will be fit to nouriſh Crops again. In this Caſe of the Graſſes, that under Part of the Soil, inſtead of being thrown up, is exhauſted by Plants, whoſe Roots go down to it; and the upper Part lies at reſt, or at leaſt with very little Demand of Nouriſhment from it, and is all the Time ſheltered by the ſpreading Branches of the Crop, and enriched by the Dews and Rains; and occaſionally by the Dung of Cattle fed on the Growth as it ſtands.

This is the Syſtem of Improvement by artificial Graſſes, and in this Account it is plain, that the Practice of the Field exceeds that of the Garden, as the Succeſs indeed evidently confirms.

CHAP. XIV.

Of Clover, its moſt proper Soils, and the Manner of ſowing.

WHEN we ſpoke of the artificial Graſſes, as being the natural Product of other Countries, we made a Reſerve in Favour of Clover, by ſaying only, they were ſo in general. As to this in particular, it agrees in the Manner of raiſing and cultivating with the reſt; and we have the Seed of ſome Kinds from Abroad; but it is in its Origin a Native of our own Country. The common red Trefoil, vulgarly called red Honey Suckle, is Clover in a wild State; and there is no other Difference between that and what we raiſe by Culture, but what the richer Soil and Addition of Dreſſings has originally made.

Clover, and the other Plants raiſed under the Name of artificial Graſſes, have not the leaſt Reſemblance of Graſs in their Form, or Manner of growing, the Uſe they ſerve in ſupplying the Place of Graſs, is what has occaſioned their being called by the ſame Name.

Clover is a low Plant, and naturally grows leaning on the Ground. The Roots are fibrous and whitiſh, ſome few ſmall ones ſpread under the Surface, but the greater Part penetrate ſtrait down. To draw up a Root out of common Ground, one would ſuppoſe it did not go down above two or three Inches; in a well manured and well tilled Field, where the Earth is light and mellow, the longeſt Fibres carefully drawn, will meaſure about ſix Inches; but they may be traced with Care to fifteen or eighteen Inches; and do really penetrate much farther, but that they are then very fine, and ſcarce to be diſtinguiſhed.

The Stalks, when Clover is well ſupplied with Nouriſhment, are numerous, jointed, and ſpreading. The Leaves grow from each Joint of each Stalk, and many from the Root. Each Foot Stalk has three upon it, and they are often ſpotted in the Middle. The Flowers are red, and ſtand in little Tufts or Cluſters, at the Tops of the Branches. They are of the Shape of the Pea Bloſſom, but very ſmall, narrower, longer, and not ſo open; and the Seeds are contained in a Kind of little Pods. There is a Drop of a Honey-like Juice at the Bottom of each Flower, whence it obtained the Name of Honey-ſuckle, a Name given alſo by many to the Wood-bind.

This is the general Deſcription of Clover, which differs according to the Degree of Culture in Bigneſs, and the Form of ſpreading or ſtanding more erect, but not otherwiſe. The wild Honey-ſuckle, which is common wild among the Graſs of dry Paſtures, is an Advantage to it. This is low and ſmall, and in a great Meaſure lies down upon the Ground: in Fields where it is ſown, and carefully cultivated, and is raiſed from Seed that was got from cultivated Plants, it is larger and more erect. The Leaves alſo are larger, and ſo are the Heads of Flowers, and the ſeparate Flowers in them. We have alſo what we call the Iron Clover, which is very ſweet and leſs than this, but it differs no otherwiſe than from the ſame Kind of Accidents. The DUTCH and FLEMISH were the People who taught us the Uſe of Clover, and they raiſe it to a great Advantage at this Time, the Quantities they ſometimes obtain from an Acre being too great for the Credit of thoſe who have not ſeen their great Care and excellent Managment.

With Reſpect to the Soils for Clover, the richeſt always ſucceed the beſt with it, and there is none ſo good but it may be worth while to raiſe Clover upon it. There is Land too rich for Corn, for it will make it too rank, but this will excellently nouriſh Clover; and on the other hand, it is a bad and ignorant Practice to ſow this Species on poor Ground, for it will never come to any thing.

Whatever would be needful to do to ſuch Land to ſuit it to the bearing of Corn, the ſame will be neceſſary to make it bring Clover to good.

In all this we mean only to ſhew what is neceſſary for Clover, but we ſhall inform the Farmer, that in the common Courſe of Things it is not to be ſown on rich Land new broke up; or on ſuch as has been dreſſed and prepared purpoſely; but is to follow Corn as we have mentioned before, and will then ſerve in the double Capacity of yielding a rich Crop itſelf, and preparing the Land for Corn again.

As to the different Kinds of Soils, the beſt for Clover is a light, warm, and rich Earth. Such as is principally what we call mellow Earth, but with a Portion of ſomewhat loamy, for otherwiſe the pure mellow Earth alone is apt to lie too heavy for Clover.

A very rich Loam is an excellent natural Soil for it.

Whatever Land be deſigned for Clover muſt be brought into perfect good Tillage, and for this Reaſon it very well follows Corn, as in that Caſe it comes upon a Land which has been well wrought, and with Reſpect to the Nouriſhment it requires, is not exhauſted. This we have explained already.

If the Farmer ſhould chuſe to break up a Piece of Ground on Purpoſe for Clover, the Freſhneſs of it will make that Growth ſucceed, though in its Nature it ſhould be improper. As to other

Soils different from thoſe we have named, if the Farmer finds it convenient to his Affairs to uſe Clover upon them, he muſt manure them accordingly. Marle, Dung, Lime, or the other Manures in general, which are uſed to prepare Land for Corn are alſo the proper, and they are the only Methods of preparing it in this Caſe for Clover.

The common Cuſtom of ſowing it with Corn is liable to ſome Objections, but they may be got over by a proper Management, and then this will be found a profitable Method.

Nothing is more common than the ſowing Clover with Barley, in which Caſe it is apt ſometimes to over-power the Barley in its firſt Growth, and will then do it great Damage. In a wet Summer the Clover will grow at a great Rate, and the Damage of the Barley will be very great this Way; and on the other hand, in a very dry Summer it is too apt to fail.

To prevent the Damage of the Barley by the Growth of the Clover, the beſt Way is, though they are ſown on the ſame Ground, not to ſow them at the ſame exact Period. When the Farmer intends to have a Crop of Clover and Barley upon the Ground at the ſame Time, let him ſow the Barley alone in the uſual Manner, and wait till it is three Inches high above the Ground: then let him ſow his Clover by Means of a Hand Drill. This will anſwer the Purpoſe extreamly well. The Clover will do better than when the Seed is ſcattered at Random; and not the leaſt Damage will be done the Barley, by drawing the Drill by Hand through the Field, the Perſon entruſted with the Work being tolerably careful.

In this Way the Barley will have got ſo much Head before the Clover ſhoots, that it will be too ſtrong to be over-powered and ſtarved by it; and at the ſame Time, if the Seaſon prove dry, it will be high enough to defend the Clover, which otherwiſe, in a wet Summer, would have over-powered it.

We have ſaid that Clover may be ſown alone, but when it is judged more proper, as is commonly the Caſe, to ſow it with another Crop, Barley is not the only Kind: it may very well be ſown with Oats.

When a Crop of Corn is to have Clover among it, leſs Seed ſhould be uſed than if it were to grow alone, and as to the Manner of ſowing it, if that be done by Hand with the Corn, there ſhould be choſen a fine mild Day for the Purpoſe; becauſe the Seed is ſo light that otherwiſe it would be blown about, and left on the Ground in a moſt irregular Manner. But the beſt Way by far is, the drilling it in afterwards.

The Time of ſowing it muſt depend upon that of the Corn with which it is to be ſown; and in this Caſe the little Time after is very well worth while waiting, for though it keep the Clover back, it brings the Corn forward: on the other hand, if the Farmer be deſirous of having a Crop of Clover early in the Ground, though ſown with Corn, the beſt Method is to ſow it with black Oats, and get them in as early as poſſible.

The Spring Corns are not the only Kinds among which Clover may be ſown. It will thrive very well with Wheat and Winter Rye, if ſown with them in the Beginning of October. Indeed there are Advantages attending this Method, that are to be had with no other. We have obſerved that a dry Summer hurts a Crop of young Clover extreamly. There is no Plant that more requires Rain in the Time of its firſt ſhooting, for ſome Months. It is for this Reaſon that when ſown very early with black Oats it always thrives, becauſe it has then the Advantage of the Rains of Spring. But when it is ſown in the Beginning of Winter, with Wheat or Rye, it fares ſtill better, for then it is ſure to have a long Time of wet, before there be any Sun or Drought to hurt it. In this Caſe alſo it ſtrengthens itſelf in the Ground extreamly, and is always found very thick and flouriſhing on the reaping of the Corn.

Some might be apt to fancy that a thick Crop of Clover growing among Wheat, in this Manner, would impoveriſh that Grain, or be impoveriſhed itſelf, becauſe of the great Quantity of Nouriſhment it requires; but we have ſhewn already why they do not interfere with one another, the Wheat rooting ſuperficially, and the Clover deep.

When Clover is ſown alone October is the moſt preferable Time, though the Spring be commonly choſen. Very ſevere Weather may hurt it, as it will almoſt any thing, but Clover being a Native of our Country, is not a very tender Plant: if the Winter be tolerably mild it will make very vigorous Shoots, and ſtrengthen itſelf in ſuch a Manner in the Ground, as to yield a very early and very plentiful Crop in the ſucceeding Summer; after which it will continue firm in the Ground, and encreaſing in Value. There is alſo this particular Advantage in ſowing Clover in October, that it comes up in a Manner free from Weeds, whereas in Spring they riſe in Abundance among it, and many of them being of quicker Growth, they will over-power it.

Many, when they are about to lay down a Piece of Corn Land for Graſs, chuſe to ſow it with Ray Graſs and Clover; but in this Caſe the beſt Method is to ſow them at different Times, though they are to grow together afterwards: thus the beſt Corn for ſowing with Ray Graſs and Clover is Wheat, and the beſt Way of doing it is this. The Wheat being ſown at its natural and uſual Time, let the Seed of the Ray Graſs be ſown with it; this will be naturally ſometime in October; and let the Clover be ſown in the following Spring. This muſt be done early, that the Clover may, during its firſt Growth, have the Advantage of the Rains of the Spring, and be got to an Height in Summer.

There is alſo, in the common Way of Huſbandry, another Reaſon for ſowing it very early in the Spring in this Caſe, which is, that nothing more can be done as to the Covering it at that Seaſon, but rolling the Field; now rolling, while the Corn is very young, will help it; but if it ſhould be done when it has got into Stalk, it will hurt it extreamly by breaking the Stems, which very difficultly recover ſuch an Injury, after they have arrived at any Strength. This we have explained at large in a preceding Part,

under the Article of Rolling, and therefore need enter no farther into the Matter here.

But we ſhall add for the Information of the Farmer on this Head, that when he thus ſows two Graſſes with his Wheat, he is to let in the laſt in the ſame Manner as with the Barley, if he will follow the moſt reaſonable Practice. Thus let him in this Caſe ſow his Ray Graſs with the Wheat in OCTOBER; but when he comes in Spring to ſow his Clover, let it not be done in the common random Way by Hand, but let him uſe the Hand Drill, and ſow the Clover juſt as we have directed when it is to grow with Barley.

As to the Damage that the ſevereſt Winter can do to Clover, it is not nearly ſo great as that of a dry Summer to ſuch as has been ſown late in Spring. If the Roots be tolerably covered, and the Soil lie any Thing cloſe about them, they will get no Harm; and for that Reaſon when the Farmer finds Danger of the Winter, with reſpect to a young Crop of Clover that is alone, his beſt Method is to turn in his Sheep to eat it before the Approach of the ſevere Seaſon. The Leaves and Stalks which would have been perhaps in a great Meaſure deſtroyed by the Froſts, and long lying of Snow, will have anſwered their Purpoſe, and been eaten; and the Root being better ſecured than before, by the trampling of the Cattle, which fixes the Ground about it, will ſtand perfectly well; and having no Head to ſupport during the Winter, it will ſend up its Leaves and Stalks vigorouſly in the Spring.

The Huſbandman thus underſtanding the Nature of Clover, the various Manners of ſowing it, and the Reaſons for each: is to conſider next the Nature and Quality of the Seed; and to take Care that he chuſes ſuch as is new, and of a good Kind. Among the ſeveral Quantities of Clover Seed offered to ſale, the Huſbandman will find a great deal of Variety of Colour; ſome is yellowiſh, ſome rediſh, and ſome blackiſh. Theſe are three Colours that are to be his firſt Guide in the Choice; the yellowiſh is the beſt, and to have the true Tint, this ſhould be a greeniſh yellow; the rediſh is the next good Colour, that which is black is worſt: but the Colour is not all that goes to the Choice, it muſt be ſound and freſh.

It ſhould be clean, large, and gloſſy on the Surface, which is always a Proof of its Goodneſs, as a duſty heavy Aſpect ſhews it has been damp, or has had Inſects in it. The Seed being underſtood as to its Marks of Goodneſs, the next Conſideration is the Quantity; about this there is much Diſpute among thoſe who have moſt Right to know, that is, the practical Farmers. Some ſay ſix Pound is enough for an Acre, others uſe twelve or fourteen Pound.

In general, we ſee the Practice is wrong in allowing too much Seed; but thoſe who uſe this ſmalleſt Quantity err on the other Side, for ſix Pounds is too little. Clover is a Plant that never grows to any conſiderable Size; when it is beſt planted it is but ſmall in Compariſon of other of the artificial Graſſes, therefore the Plants are not to be kept at that Diſtance which the others be with Advantage. Eight Pounds of good Seed is as little as ſhould be allowed to an Acre in any Condition; and thoſe who go beyond ten, allow as much ſuperfluous, as thoſe who ſow but ſix too little; nine Pound may be called a good Quantity: and notwithſtanding all I have heard, to ſpeak from what I have ſeen, are repeated Trials, the largeſt Quantities yield not only the ſmalleſt, but the worſt Crop.

This is a Conſideration of the more Conſequence to the Farmer, in that too many of thoſe who have written to inſtruct him, run into the common Error, and ſay, that a very large Quantity of Seed, larger than the moſt I have named, will yield him ſo much the larger Crop. This has been the general Error: the ſowing too ſparingly is an Error alſo; and though it cannot be attended with ill Conſequence in thoſe Plants which will grow to a very large Size; or ſend out numerous Stalks, with Ears on them, as in Corn, yet in Reſpect of Clover, and all the like Kind, it may defraud the Farmer doubly; firſt in preventing him from ſo good a Crop as the Land would very well have borne, and next in not doing the expected Service in preparing the Ground for Corn afterwards; for this cannot be perfectly done, unleſs it be entirely covered.

CHAP. XV.

Of the feeding Cattle on freſh Clover.

THERE are two diſtinct Uſes for which Clover is ſown; the one is, the feeding Cattle upon it as it grows; and the other, the laying it up for Mowing, for the making it into Hay: in this it perfectly reſembles the natural Graſs, and anſwers both theſe Purpoſes in the ſame beneficial Manner. But there muſt be Care in the feeding it on the Ground, otherwiſe it may be attended with Danger.

We know that the richeſt Foods on our own Tables are capable of doing us the moſt Harm. They will often breed Diſtempers in us, and Cattle are no more exempt from them than we are.

Clover is a very rich Food for them, and they are ſo fond of it, as to eat of it often immoderately; wherefore unleſs Care be taken, eſpecially when the Clover is rich, and they are ſuddenly turned into it, they will get Diſorders. The Quantity and Richneſs of the Nouriſhment that is in Clover are ſuch, that an Acre of it will, on a moderate Computation, feed as many Cattle as ſix Acres of the common Run of Paſture Grounds: but, in order to make the moſt of it, they ſhould not be turned into the Field to trample it down at random; but it ſhould be mowed freſh and freſh as it is wanted, and given them green in Racks. As to the mowing it for Hay, that is a quite different Conſideration, and will be treated off in a diſtinct Chapter.

The Danger of Cattle being turned at random into freſh Clover is, that they will eat of it till they burſt. For this Reaſon it is beſt to feed them with it freſh mown, in proper Quantities firſt,

firſt, that they may be a little uſed to it, before they are turned in to take their fill. The Novelty of the Taſte is one Thing that recommends it, and they are like Children in the Shop of a Grocer, whoſe only Danger is till they are uſed to the ſweet Things; after which they will not eat to hurt themſelves.

Some Conſideration muſt alſo be had as to the State of the Cattle, for ſome will bear a rich Nouriſhment better than others; and as for ſuch as ſeem to be moſt likely to receive Miſchief from it, the beſt Way is to give them Straw with it at firſt; and bring them to the rich Food alone by ſlow Degrees. This is an Article that will be better explained when we come to treat of the Diſorders of Cattle, and the natural Regulation of them in Point of Health.

When they are turned into the Field of Clover, it ſhould be done gradually; and this Rule holds good concerning thoſe which are well enough to be truſted in at once, as well as ſuch as muſt have this Preparation.

The right Method is firſt to turn them in about the Middle of a hot Day, when they have eat before, and the Leaves of the Clover are a little flagged. The great Danger of this Food is, when it is eaten in too great Quantities, and when the Dew is upon it; therefore Care being taken as to the Dryneſs of the Clover, the next Article is the not ſuffering them to eat too large a Quantity. They ſhould be ſuffered to be in the Clover but Half an Hour the firſt Day; the next Day they ſhould be turned in at the ſame Time, and left an Hour, and ſo on till they are accuſtomed to it: this we have obſerved generally before, ſpeaking of the Horſe and its Food, but it is proper to be more particular here.

Some Regard is to be had to the Weather in this Reſpect; for Experience ſhews, that Clover is very apt to damage Horſes in wet Weather, and much leſs ſo in dry. We have before ſpoke of the Danger of letting Horſes eat of it while the Dew is on the Leaves. Any wet with Clover makes it more dangerous than when dry, and it is from this that the Caution riſes.

It is alſo for the good of the Clover, as well as of the Cattle, to keep them off in wet Weather: their Feet are apt to do a great deal of Harm at any Time, but they will do moſt when the Ground is moſt damp.

The Addition of Ray Graſs to Clover is very advantageous in all Reſpects, and in none more than this of Health to the Cattle that feed upon it. This Ray Graſs is more of the Nature of the common and natural Graſs of our Paſtures, which is their proper Food; therefore being mixed with the other, it tends to correct its Richneſs; and, in ſome Degree, anſwers the Purpoſe of Straw, which we have ſaid is proper to be mixed with it. Then at the ſame Time that it renders it more wholeſome, it increaſes the Crop in Quantity, for this ſpreads under the Surface at the Root; whereas the Clover penetrates down deep, ſo that they grow as well together as the Corn and the Clover; and the Quantity is vaſtly increaſed upon the Ground; for the Leaves grow together as naturally and as well as the Roots, ſtanding no more in one another's Way than they do. The Clover ſpreads in an open looſe Manner, and its Branches ſhelter the Ground where the Roots of the Ray Graſs ſtand, ſo that it is moiſt and full of Nouriſhment; and, in the mean Time, the narrow ſlender Leaves of the Ray Graſs riſe up and appear through the Clover, without any Difficulty or Moleſtation. Both theſe grow together; and are fit to be mowed together for drying, or to eat together on the Ground: but there is this Caution to be given the Farmer, that Clover and Ray Graſs do not ſerve the Purpoſe of preparing the Land for Corn any Thing nearly ſo well as Clover alone. We have ſhewn how a Crop of Clover improves the Ground, which is, by ſheltering the ſuperficial Part, and drawing its Nouriſhment from ſome Depth; ſo that the upper Part, while it gets ſheltered, is unexhauſted: but this is only to be done by Clover alone, for Ray Graſs roots ſhallow as Corn does, and therefore the Ground is, in ſome Degree, exhauſted where the Corn is to get its Nouriſhment.

We do not ſpeak this ſo abſolutely as if Ray Graſs was never to be mixed with Clover, where Corn is intended to come afterwards. We give the Farmer his full Inſtructions, and he will know by this, that, in general, Clover alone is proper to be ſown where the Land is ſoon to bear Corn again; but, on the contrary, when it is intended to lie longer in Graſs, then Clover and Ray Graſs together. When Ray Graſs is mixed with Clover, where Corn is to follow ſoon, the Quantity of the Ray Graſs muſt be but ſmall; whereas when the Ground is to lie long in Graſs, the Quantity of the Ray Graſs ſhould be large. This is the whole Inſtruction in general Terms, and this the Farmer muſt, on every Occaſion, ſuit to his preſent Circumſtances and Situation.

Cows are ſubject to Diſorders from Clover as well as Horſes; and when it does not take this Effect, it injures their Milk in Flavour, and is prejudicial to the Productions of the Dairy. This Accident is alſo greatly abated by mixing Ray Graſs among the Clover in Sowing, for this being nearer the natural Provender of the Cow, takes leſs Effect upon her than with the other. The common Graſs of our Paſtures has frequently the wild Clover, we have named among it; ſo that there is no other Difference between a Field of Clover and Ray Graſs, and one of our common Paſtures, where there is a large Share of Honey-ſuckle Trefoil among the Graſs; but that the one is a Mixture of Graſs and Clover, in which the Graſs has the larger Proportion; and the other is a Mixture of the ſame Things, in which the Clover has the largeſt Part.

Clover, though it is a much more laſting Crop than any of the Pulſe Kind, which are ſown for the ſame Purpoſe of improving the Ground, yet is but of a certain Duration, and that not equal to Saintfoine, or ſome other of theſe artificial Graſſes. In general, Clover will laſt well enough three Years; but after that it declines ſo greatly, that it is not worth the continuing it upon the Ground. It is not that it

will have exhauſted the Ground ſo, that it cannot be made to grow on it again without Culture, and due Preparation. Therefore the Farmer at the End of three Years, muſt, in the common Courſe of his Practice, plow up the Land again: if he deſign it for a different Crop, he will find it very well improved and fitted for it; if he intend to continue the Clover longer upon it, he muſt ſow a freſh Parcel of it after good Plowing, as he did the firſt, and it will ſtand three Years more very well in the ſame Manner.

We ſay the common Practice requires this; but it does not follow, that the Thing is in itſelf abſolutely neceſſary. For it might be much otherwiſe in another Manner of managing the Crop.

We have ſhewn that on certain Occaſions, common Graſs requires its Year of Reſt from the Scythe; and in the ſame Manner, if Clover on the third Year were not to be mowed, but only eaten, it is highly probable that it would recover itſelf ſo as to laſt longer. This I have ſeen tried where it anſwered moderately well, and the Soil was but indifferent; it is an Experiment very well worthy to be made, where there is better Ground; and the Farmer has the full Advantage. By what appears already, it ſeems very likely to anſwer well.

The Dutch, who ſave every Thing, were the Inventors of the Cuſtom of cutting the Clover green, and giving it to Cattle in the Racks, inſtead of turning them into the Field: and beſide its not ſubjecting them to Diſorders, there is a great deal of Frugality in this Management; and the Difference between thus uſing it green, and in the Hay are very great, for ſcarce any Thing loſes more in drying.

In thoſe Places where Clover was firſt given in this Way to the larger Cattle, it was diſcovered that Hogs are very fond of it: they were ſeen, and always are ſtill when they can get at it, feeding greedily upon the Refuſe that falls from the Racks. This led to the trying them with Clover; and it has been found a very excellent Food for them. Some have gone ſo far as to propoſe very extravagant Profits from this Uſe of Clover; but without believing ſuch Accounts, or truſting to ſuch Calculations too ſtrictly, there may be great Advantage in feeding them with it in a proper Manner.

The Benefit of feeding Cows on Clover would be much more regarded, were it not found to give a Taſte to the Milk; but the Farmer when he ſees an Inconvenience, is not to ſit down as if it could never be remedied. In this Caſe the Cure is very eaſy, it is only the not letting them feed entirely upon the Clover. Every Body knows that the natural Food of the Cow is the common Paſture Graſs; therefore as the Clover is not ſo natural, it ſhould not be given alone. When the Ray Graſs is mixed with Clover in the Sowing, the whole is more proper for Cows, than when the Clover is ſown ſingly; but, in either Caſe, the beſt Method is to feed them in Clover during the Day, and to turn them into a common Paſture of natural Graſs in the Night: this gives them a Mixture of the common with the richer Food, and their Milk, while it is rendered very abundant by the Uſe of the Clover, is kept to its common Taſte and Qualities by the other Graſs.

The Reaſon why Clover will not ſucceed ſo perfectly in the feeding of Hogs, in the Manner thoſe propoſe who have projected that Improvement is, that when they are turned looſe into a Field of it, according to that Propoſal, they deſtroy and taint it with their Dung and Urine, after which they will not eat it freely. This, beſide the Quantity they tread down, is ſo great a Diſadvantage, that I have ſeen frequently, where Hogs have fed plentifully, and throve extreamly upon it for a Time after they were put in, they have afterwards pined away, and grown miſerably poor. It is not that the Clover does not agree with them after a Time, but that they have ſpoiled it, and don't like it any longer in that Condition. 'Tis certain, that by feeding them with it properly, it would be an excellent Improvement upon the common Methods in that Reſpect.

Sheep are alſo fed very advantageouſly with Clover: they will eat it with equal Freedom freſh, and in the Condition of Hay; and it is of vaſt Service in the breeding up of Houſe Lambs, which, in the Neighbourhood of great Towns are ſo profitable an Article. The Ewes feed on it in Summer in the Field, and in Winter on the Hay under Cover; and there is no Food that ſupplies them with ſuch Plenty of Milk, or ſuch as is ſo fit for the nouriſhing the young.

The Farmer who manages with Prudence, will find this a vaſt Article in the feeding of his Horſes in Summer and in Winter; the Graſs and Hay being equally proper, under a right Management. And beſide the Advantage he receives from it in reſpect of his Ewes and Houſe Lambs, his Weather, Sheep, and Graſs Lambs will very well fatten upon it; and the Store Sheep may be ſupported on it during the Summer.

Theſe are ſuch important Articles in favour of Clover, that when they are named together, he muſt be a very poor Huſbandman who does not ſee the Advantage he will find in ſowing it.

Beſide the ſeveral Methods of Sowing it, which we have named alone, and with the different Corns; ſome have ſowed it with Peaſe, and others with Horſe Beans. In the firſt Caſe, the Peaſe are very apt to ſpoil the Clover; but there are Occaſions in which it is proper. The Beans, as they do not lie upon the Ground in the Manner of the Peaſe, are not liable to the ſame Objection; but then the Preparation of the Land for Beans being leſs than for Peaſe, and the Clover requiring a very well tilled Land, this does not ſucceed ſo well. When the Change of Crops renders it neceſſary, theſe Things may be done; and ſome Time may be ſaved by a Crop of Clover, in which the Ground otherwiſe would be idle; but theſe are accidental Conſiderations. The proper and profitable Methods are thoſe we directed in ſpeaking of that Article; either with Clover alone, with Ray Graſs in the common Method, with Barley or Oats, or with Wheat.

We have entered at large on the Uſe of Clover as it grows; we are now to conſider it in the Condition of Hay, with its ſeveral Uſes.

CHAP. XVI.

Of the mowing of Clover, and its Hay.

THE Farmer is to compute according to the ſeveral Circumſtances of his Stock, and his Ground; how far he ſhall want the Aſſiſtance of his Clover green, and how far in Hay. We have obſerved that the Mowing it every Year is a Practice which might occaſionally be let alone to Advantage; but the Growth is ſo ſtrong, that it may alſo, where Circumſtances ſuit, as they uſually do, be mowed more than once in the Year.

The firſt Time of Mowing is toward the End of MAY. The Root has been by this Time well ſtrengthened in the Ground, having ſtood through the Winter; and the Shoots are numerous and ſtrong. The Farmer is now to look well upon it for the proper Seaſon, for it is not in the Nature of theſe Things to allot any certain Day of the Month. It is a particular Condition of the Plant that gives it a Properneſs for Mowing, and this may happen according to the Soil, Seaſon, and many other Accidents forwarder one Year, and backwarder another; and earlier in one Crop, and later in another the ſame Year.

We have told the Farmer the latter End of MAY is the uſual Time of Clovers coming fit for cutting, and that it may be ſooner. He ſhould therefore begin to look upon it in the Middle of MAY; and obſerve in what Condition it is with Reſpect of flowering. As we have told him reſpecting common Graſs, we may add on this Head, that the Time when Clover is fitteſt to be cut for Hay, is juſt when it is getting into Flower, that being the Period of the Growth, in which the Leaves and Stalks of all Plants are fulleſt of Virtue. This we ſpeak of Clover with Reſpect to the cutting it in MAY or thereabouts, for Hay alone. There comes a farther Conſideration afterwards, when it is cut at a proper Time of the Year for Seed.

In this MAY or firſt Crop therefore, the Farmer is to conſult only the Richneſs of the Stalk and Leaf, and to find when that is at its greateſt Perfection, he is to examine the Heads with reſpect to their flowering.

The Flowers of Clover grow in ſmall Tufts, or roundiſh Heads, at the Tops of the Branches, and theſe appear there in form of roundiſh, green, hairy Buttons, ſome Time before the Flowers begin to open. The Farmer is to watch the Appearance of theſe, and to obſerve how they gradually come toward Ripeneſs; and he is to ſend in his Mowers juſt before they begin generally to blow. A few will make a Shew here and there in the Field, while the reſt are exactly in their right Condition; for there is no Plant in the World, a whole Field of which gets into flower all together. This is his Time for ſetting to work in Mowing, when all the Plants are full of Heads, and ſome few of them only have begun to open into Flowers. Let him perfectly comprehend the Reaſon of this Conduct; it is the more needful to explain it to him fully, becauſe ſeveral have erred in the Reſpect of letting the Clover ſtand too long for the firſt Mowing; and they think ſtill in many Places, they ought to ſee it in full Flower all over the Field before they begin.

The Intent of the Farmer here is, firſt, to get a Crop of rich Hay, and next to have his Clover Roots in a ſtrong and vigorous Condition; for their ſhooting quickly and ſtrongly afterwards, is a Thing of great Conſequence to him.

We have ſhewn that the Time when his Hay will be beſt of all, is when it is juſt getting into Flower, and this is a Time at which it has not exhauſted the Roots: this is a very material Conſideration. If it be cut juſt at that Period, the Roots are in full Vigour; and having loſt the large Head they had to ſupport, will puſh out their Shoots with a ſurprizing Strength; but if the Plant have been ſuffered to ſtand till all of it be in full Flower, and ſome getting into Seed, which happens very ſoon afterwards; then the Store of Nouriſhment that has been called up, has, in a great Degree, exhauſted the Roots, and they will grow very poorly afterwards for ſome Time.

Therefore as ſoon as all the Plants are knotted, or have the Heads formed at the End of their Branches, let the Crop be cut; and let the Mowers have Caution given them to cut it as even as poſſible, for this greatly forwards the Growth of the new Shoots. When cut, it is to be managed exactly in the ſame Manner as common Graſs, and ſo made into a dry, firm, and ſound Hay. The Farmer muſt not be ſurprized at his Clovers ſhrinking in the drying, for that it always does in a very particular Manner, its Branches falling together, and the Whole getting into a very ſmall Compaſs, compared to what it filled while growing.

Great Care is to be taken thoroughly to dry this, becauſe having a great deal of natural Moiſture, it will otherwiſe be very ready to become damp afterwards, and by that Means to decay. Being cut at this proper Growth, and carefully managed in the making, it will be an extreamly rich and wholeſome Food for the fattening all Kinds of Cattle. When it has ſtood too long upon the Ground before the firſt cutting, it not only impoveriſhes the Roots, but the Hay itſelf is too rank, and has not the excellent Qualities of this firſt Crop when made in Perfection.

After the mowing this Crop the Land is to reſt, and occaſionally it may be mowed again once, toward the End of Summer, or twice: the former Time in JULY, and the other toward Autumn. There may be Reaſons for cutting three Crops of Clover; for different Farms are ſituated and circumſtanced variouſly; but to ſpeak in general, it is not what the Farmer ought to make the Rule of his Practice. Very often when three Crops are cut, there is not Weather for making the

the laſt tolerably, for we have obſerved that the Clover requires good Weather, more than common Graſs, becauſe of its juicy Nature, which will eaſily contract Damage. At beſt, when the Seaſon favours moſt, the ſecond Crop impoveriſhes the third, and ſeldom gives it Time to ripen.

We have ſaid any particular Farmer's Affairs may make Variations from all general Rules neceſſary; but in the common Run of Things the Advice that is moſt profitably to be followed, is to make but two Crops of Clover Hay; and this is very material, when one of them is intended for getting of Seed, which is very proper: in this Caſe there requires a Time for the Crop to ripen thoroughly, which it will rarely do when two have been cut before.

We ſhall conſider the laſt Crop of Clover in the Summer, to be intended for Seed; and in this Caſe it muſt ſtand a good while. The Owner muſt look in upon it from time to time; and watch the Seaſon of its Seeds being ripe. He muſt wait for this with Patience; and he may wait without Fear, for this is not one of thoſe Crops, the Seeds of which are apt to ſhed.

If the Clover have been well managed, the Seeds will begin to appear in the Huſks toward the End of Auguſt, ſooner or later, according to the Soil, Seaſon, and Manner of ſowing: from this Time it will take between three Weeks and a Month to be thoroughly ripe: and when it is in that Condition the Stalk will begin to grow brown. This is the Caſe in all Plants, and this is the Time for mowing it on this Occaſion. When the Stalks are grown brown or yellow, and on opening the Huſks the Seed is found to be yellowiſh, the full Time of cutting it is come, then the Farmer is to take the Advantage of a good dry Day, and get it down. It is then to be made with Care into Hay, but this does not require all that Length of Time that a Crop does when the Stalks and Leaves are fuller of Juice. When dried it is to be laid up, and to be kept in the Straw in Spring.

Toward the latter End of March it is to be carefully thraſhed and ſeparated from the Straw. After this the huſky Part is to be well dried in the Sun, and then thraſhed again; after this ſecond thraſhing it ſhould be ſpread for a farther drying, and then worked about with Rakes, and rubbed thoroughly in the Hands, and by this Means a great deal more Seed may be got out of it.

By the Difficulty that the Farmer will find in getting the Seed of Clover clean, he will learn not to be afraid of letting it ſtand in the Field till thoroughly ripe, for otherwiſe it will never ſeparate tolerably; and he may be ſure there is no great Fear of Waſte, in a Seed that is thus unwilling to leave the Huſk at any Rate.

Two Buſhels of good Seed will generally be had from an Acre of Clover, well managed and well threſhed: this is the niceſt Affair in all thraſhing, ſo that the Farmer muſt ſee to get a Perſon who underſtands it: ſuch a one will do four Times the Buſineſs of another.

The Difficulty of getting the Clover Seed clean from the Chaff, has induced ſome to prefer ſowing it in the Huſk, and there is no great Danger of its ſucceeding, provided it can be diſtributed properly on the Ground; but as the Wind is apt to have too much Power upon Clover Seed, in the common Way of ſowing it, when it is clean and free from the Huſk, it muſt neceſſarily have more this Way, and there will be danger of its blowing into Heaps in ſome Places, and leaving others vacant.

This Objection is only of Force againſt the common Way of ſowing; but where that is done by the Hand Drill, as we have adviſed in the ſowing Clover with Barley, it may as well be uſed Huſk and all, for it may be laid in with the ſame Regularity as if naked.

The Seed of Clover the firſt Year is better than any other, but it will grow very well the ſecond; after this it is hazardous truſting it, a great deal of the Seed miſcarrying.

CHAP. XVII.

Of the Soil for Saintfoin, and its Growth.

IN the Part of this Work regarding the Drill and Horſehoeing Method of Huſbandry, we gave an Account of Saintfoin, as an Inſtance of one of the Crops to which that Practice is ſuited; having therefore occaſionally and neceſſarily given an Account of the Nature of the Plant there, we ſhall not repeat it in this Place, but conſider the Advantages of that Crop, and its Method of Culture according to the uſual Ways of Huſbandry.

Two Articles give Saintfoin the Preference againſt Clover; theſe are, its larger Size and its longer Continuance in the Ground. Clover, we have ſhewn, laſts properly but three Years, Saintfoin will laſt four Times as long; or more than that if neceſſary. In order to keep Clover a little longer upon the Ground without freſh ſowing, the ſecond Crop muſt be given up as to mowing; it muſt ſtand to Seed after the firſt Crop: and when the Seeds have ſcattered themſelves, Sheep muſt be turned in to feed upon it. This is a Method attended with evident Diſadvantages, and is often inconvenient: Saintfoin requires no ſuch Management: let a Ground be once well covered with it, and it will take Care of itſelf afterwards; when it is thought fit to plow up the Land, Corn thrives excellently upon it: the Method of doing this, we have ſhewn already, in ſpeaking of the various Methods of Tillage.

As to the Soil proper for Saintfoin, any thing will do except Chalk; this it naturally abhors, but on very poor, ſtony, and ſandy Grounds it will do very well: and though a Plant that naturally roots very deep, yet it will thrive where the Mould is but ſhallow: its deep rooting is a great Advantage where there is Compaſs for it, for this makes the Leaves of Saintfoin look freſh, and ſerve excellently for the Cattle, when all others are parched with a Drought in hot Summers. The Sun can take no Effect upon a Root that goes ſo deep; and it always finds Nouriſhment there, while the ſuperficial Mould in which Clover, and ſuch other Things are rooted, is ſcorched and dried up.

Saintfoin is an excellent Crop any where, but

it will anſwer the Farmer's Purpoſe beſt of all in thoſe Places where Manure is ſcarce: it may therefore be conſidered as one of the beſt Crops the Farmers in the remote Countries can take into their Hands. They need not be afraid of a ſtony Bottom under the ſhallow Mould in theſe Places, as that is a common Condition of much of the Land there, for the Saintfoin will puſh its Roots through the Cracks that there always are in Beds of Stone near the Surface, and by that Means find Nouriſhment lower, where one would not ſuppoſe the Roots of any Plant could reach.

CHAP. XVIII.

Of ſowing Saintfoin, and managing it while on the Ground.

SAintfoin ſo far partakes of the Nature of Clover, in Reſpect of the Farmer's Concern, that it may be ſown either alone or with Corn; or it may be ſown entire, or with a Mixture of Ray Graſs. But this latter Method is not of that Advantage that is in the Caſe of Clover, for Saintfoin is very well able to fill a Land alone, and it has not the Inconveniences that attend Clover, in diſordering the Cattle which feed upon it.

The moſt uſual Way among our Farmers at preſent is, to ſow Saintfoin with Barley, and this in the common Method of Huſbandry, is a very ſucceſsful Practice. The Method of doing it moſt advantageouſly is this, let the Ground be plowed three Times, to get it into a very fine Condition; for as Clover requires this, in order to produce a tolerable Crop, Saintfoin renders it more neceſſary; and it is very well worth while, becauſe of the long Time this will laſt.

The Land being well broken by Tillage, ſhould be manured with mellow Dung, or ſome of the richer Kinds in a ſmall Quantity, as Soot, than which nothing is better. This done the Barley is to be ſown, and after it is harrowed in the Saintfoin is to be ſown by the broad Caſt-way. But let the Perſon who does it have a Caution given him, to ſcatter the Seed very thin, and ſow it twice in a Place. This is the only Way of raiſing a Crop of Saintfoin according to the common Methods, with any tolerable Degree of Regularity. When ſown, the Ground is to be harrowed lightly over, and nothing more is to be done till the Time of rolling the Barley, which is alſo of great Uſe to the Saintfoin.

Thoſe who ſow Saintfoin with Oats muſt uſe the ſame general Method as with Barley, but the former is always the better.

Saintfoin may be ſown alone in Spring; but that is not the beſt Practice. It may as well be got into the Ground the October before, and by this Means there will be a Crop of it a Year ſooner than there would be in the common Way. The Choice of the Seed depends upon the ſame Particulars as that of Clover, it ſhould be clean, heavy, dry, and of a ſhining Surface. The freer from Huſks the better.

The Difference in Reſpect of the Quantity of Seed to be allowed in this, and in the Drill Huſbandry, is very conſiderable: five or ſix Buſhels are commonly allowed in this Way of the broad Caſt ſowing, to an Acre, and leſs than four is not ſufficient; the other is rather too much. When Ray Graſs is ſown with Saintfoin, the general Proportion is five Buſhels of Saintfoin Seed, and one Buſhel of the Ray Graſs to the Acre.

When Saintfoin is ſown alone, if the Weather be dry at the Time of its firſt coming up, 'tis very apt to take a Stint in the Growth, from which it is a long Time recovering; this may be prevented by watering it by Means of a Cart, with a Convenience behind pierced with Holes. In the new Method of Huſbandry this would be eaſy; but it has been practiſed in the common Way with very good Succeſs.

When Saintfoin is ſown in Spring with Barley or Oats, the ſooner it is got into the Ground the better; and in general it ſucceeds much the beſt when ſown alone in Autumn. The dry Weather that is ſo prejudicial to its Growth is not to be expected at that Seaſon.

In a ſucceeding Chapter we ſhall treat of mowing Saintfoin for Hay; but here we are to conſider the beſt Method of feeding of Cattle upon it while on the Ground. This is a very profitable Practice, but it requires ſome Management. The Cattle are not ſo apt to hurt themſelves with this as with Clover, but they may very eaſily damage the Crop; and when the Farmer finds that it is one of thoſe Crops calculated for laſting ſeveral Years, he will underſtand that it is worth while to guard againſt ſuch Accidents.

In order to his underſtanding how to do this beſt, he muſt acquaint himſelf with the Nature of the Plant. Saintfoin is very ſtrong and hardy, and is not eaſily injured when it is well eſtabliſhed in the Ground; but at firſt it is very eaſily; eſpecially at the Top of the Root, where the Damage is not readily recovered.

For this Reaſon let the prudent Farmer be tender of his Saintfoin the firſt Year. The moſt likely Methods of hurting it would be the putting large Cattle into the Ground while the Plant is very young, for its Sweetneſs will tempt them to eat it down cloſe, and by that Means hurt the Head of the Root; and at the ſame Time their Feet would increaſe the Miſchief by treading of it down.

Therefore if the Farmer finds it needful to put any of his Cattle into a Saintfoin Ground the firſt Year, Sheep are the moſt profitable; but it is beſt to omit this entirely.

The moſt beneficial Method of managing Saintfoin is to mow it the firſt Year, cautioning the Scythemen to be very regular in their Work, and not to come too cloſe to the Root: the next Year Sheep may very well be fed upon it; and after this it will have got ſo much Strength that it may, without Hazard, be uſed according to the Farmer's Circumſtances and Diſcretion in feeding and mowing.

We have named twelve Years as a Time during which Saintfoin continues very good and ſtrong; but in this all that is to be done is ſpeaking generally and in round Numbers, for according to the Nature of the Ground, and the Uſage

the Crop has received, it will in ſome Places be worn out ſooner, and in ſome it will laſt twice that Time.

When worn out it may be plowed up and ſown again, or another Piece of Ground found for that Purpoſe, and Corn ſown on this; but it may alſo be refreſhed by Manures: of theſe none anſwers the Purpoſe ſo excellently as Marle. A tolerable Quantity of this ſpread over a decaying Piece of Saintfoin, will refreſh it for ſeveral Years; and there are Circumſtances of Affairs under which this may be very well worth while. Very rotten Dung may be uſed for the ſame Purpoſe, or Soot; but nothing anſwers ſo well as Marle.

The feeding upon the Saintfoin Ground is an excellent Thing for Cattle: it is full of a rich Nouriſhment, and yet not rank. It fattens them, without breeding Diſorders. Spring is the Seaſon when it beſt anſwers this Purpoſe, and this is moſt convenient to the Farmer: the only Caution he need have in this Reſpect, is not to put heavy Cattle upon it in wet Weather: in any other Seaſon, when the Crop is well eſtabliſhed, they will not be able to hurt it; but their Feet in ſuch Weather will do ſome Damage; and the ſucceeding Crop of Hay may eaſily ſuffer more from this, than from all their feeding.

As the Spring is the beſt Seaſon for feeding large Cattle upon it, the Autumn and Winter are the moſt proper for Sheep: this alſo very well anſwers the Farmer's Purpoſe, who contrives accordingly. The great Shoot of the Spring is ſufficient for the Cows and Oxen, and the Crop recovers itſelf ſufficiently for one mowing, after which there grows a young Shoot that ſerves very well for Sheep, at a Time when they want it; and they neither damage it by their cloſe eating, nor by their heavy treading. No Food fattens Sheep ſo freely or ſo ſuddenly at that Seaſon, and none is better for Oxen in Spring, or for Milch Cows, when eaten upon the Ground, or Green in the Rack: it cauſes Abundance of Milk, and does not give it that ſtrong and particular Flavour it has from the feeding on Clover.

The general Cautions we have given muſt be enlarged or retrenched, according to the Soil and other Accidents attending the Crop. In a dry Soil and dry Seaſon large Cattle may be turned in upon the growing Crop, earlier than we have ſaid; and on the contrary, in a moiſt Soil they muſt be kept out later. Nothing eſtabliſhes itſelf more firmly in the Ground than Saintfoin, giving it Time; but when it is trampled upon young, in a damp Ground and wet Seaſon, it is damaged in ſuch a Manner, as often never to recover it thoroughly.

CHAP. XIX.

Of mowing of Saintfoin, and the Uſes of its Hay.

WE have now to mention the ſecond Condition of Saintfoin that is in the Form of Hay, and in this it is not at all leſs valuable than in the firſt. If freſh Saintfoin be excellent for the horned Cattle, the Hay of it is one of the beſt known Foods for Horſes; nor is it confined in its Uſe to them. There is a particular Management required in keeping the Ground for Hay, but it is ſo like that uſed for Clover, and indeed for natural Graſs, that the Farmer who is unaccuſtomed to this excellent Kind will need very few Words to explain it.

In order to have a Crop of Hay of any Species, the Ground muſt be laid up a proper Time for that Purpoſe. The Time for laying up Saintfoin for this End is toward the latter Part of MARCH, and from that Time two Months will bring it into a Condition for mowing to great Advantage.

Saintfoin is to be mowed like Clover juſt when it gets to Flower, with this Difference, that the Saintfoin may be allowed to ſtand till a little forward in Bloom, but it muſt not be ſuffered to remain till the Bloom begins to fade, and the Seeds to be formed. In Clover the greateſt Benefit riſes from cutting it juſt when the Heads are all formed for flowering, and but few of them have opened; in Saintfoin the exact Time is when a good Number of the Flowers have opened, but none are fallen.

It is then to be mowed and made into Hay, by frequent and careful turning: it requires more Care and Pains than common Hay, but not ſo much as Clover, the Leaves and Stalks not being ſo juicy.

The propagating Saintfoin for the Service of its Hay, is a Thing of the greateſt Importance to the Farmers, in many of our Corn Countries, for the Nature of the Land in many Places is throughout very ill adapted to Paſturage; and the Profits from Corn are ſo great, that very little is uſed for that Purpoſe in others. In ſome Places this is carried to ſuch a Height, that there are large Farms in thoſe Parts of the Kingdom that have ſome very little, and others no Land of the common Paſture Kind, ſo that the People who occupy them can ſcarce keep any Cows in moſt, and in ſome find it very difficult and expenſive to ſupport their Horſes. In this Caſe the introducing of Saintfoin muſt be a Thing of great Convenience, it is bringing in a Crop that will be managed with Eaſe in their own Way, and will grow on the common Run of their Grounds, and will come in the natural Courſe of their Tillage; and this will feed their Horſes and other Cattle, and if they chuſe to cultivate more of it will bring them a great Profit at the Market.

A Field of Saintfoin will, in ſuch a Caſe, make a prodigious Change in the Farmer's Affairs. He may feed Cows, if he have Ground near Home, with the freſh cut Saintfoin during the whole Summer, under Cover in Racks; and in Autumn and Winter he may turn them in to the Aftermath of it, only obſerving the Cautions we have given him to favour the Ground in wet Weather. When the Winter is advanced he may turn in his Sheep; and then feed the Cows under Cover again, with the Hay cut at the MIDSUMMER mowing, and in Spring turn them into the freſh Growth of it again. This is a prodigious Thing in Counties where natural Graſs is

ſcarce; the Farmer in theſe Places uſed to be confined to the ſingle Article of his Buſineſs reſpecting Tillage, and the Growth of Corn; but by the introducing of this Plant, he is able to undertake the Whole, and ſhare the Advantages of thoſe more happily ſituated, part of whoſe Land falls out naturally for Paſturage, part for Corn; and who find it eaſy to keep up ſuch a Proportion, as makes them mutually ſubſervient to one another.

CHAP. XX.

Of Lucerne, its Soil, and the Manner of ſowing it.

LUCERNE, or as the French call it, La Lucerne, is one of thoſe Plants which we have introduced like the Saintfoin from Abroad, into the Practice of the British Huſbandry.

It is one of thoſe Species which happily ſerve in the Place of natural Graſs, and are therefore called artificial ones. We have ſaid the leſs of Saintfoin in this Place, becauſe it had been treated of before on another Occaſion. Lucerne having not been mentioned yet, we are to conſider it here at large.

It is a pretty looking Plant, with blue Flowers. The Root is very long, and of a conſiderable Thickneſs. The Stalks are firm, upright, and branched; they have great Numbers of Leaves growing three on each Foot-ſtalk; and the Flowers ſtand in little Heads, followed by a Kind of twiſted Pods.

It anſwers the Purpoſes of Saintfoin to the Farmer, and, like that, endures in a ſerviceable Condition many Years.

Lucerne has been long known in Huſbandry, and at all Times very famous; we had it from France; but the Romans in antient Time have written greatly of it; and by the Labour and Expence they employed in its Culture, it is plain they were acquainted with its Value. They called it Medica, and we find frequent mention of it in all their Poets, as well as Proſe Writers, who treat of Agriculture. They preferred it before all other Plants as a Fodder for their Cattle; and by what Experience ſhews thoſe who have raiſed it here, of its Effects, they had Reaſon: it is certain nothing excels, and perhaps it would not be too much to ſay, nothing equals it; with this Character, which is vouched by the Experience of all Huſbandmen in other Countries, and in no Part contradicted by the Trials that have been made of it in England, we hope it will become more known, and in ſome Time univerſal.

We have in the laſt Chapter ſhewn the great and particular Benefit there is in Saintfoin, and there is the ſame or more in this. The Antients have left us Things concerning its Effects in fattening of Cattle, hardly to be credited; but the Account the French, among whom it is more commonly cultivated, give of it, and what I have ſeen of ſome raiſed in England, ſeem to give Reaſon to believe thoſe Relations are not much exaggerated.

It is ſweeter than Clover, or even Saintfoin; and has ſo many known Advantages, and ſo few Objections have been raiſed againſt it, that the only Reaſon why it has not been more generally introduced among us ſeems to be, that its Culture is not ſufficiently underſtood. In this, however, there is nothing very difficult; and we ſhall lay down a Method ſupported by ſome Experience, which will lead the Huſbandman to all its Advantages without any Hazard of its failing.

With Reſpect of Soil, Lucerne will grow on any. This is a Recommendation of the moſt important Kind, becauſe it puts it into every Farmer's Power to raiſe it. Tho' it will live on any, it will thrive beſt on the richeſt; but there is none where it will not be of equal Benefit with any other Crop it would afford.

The Antients were ſo ſenſible of its Value, that they gave it the beſt natural Soils they had; they improved theſe with all poſſible Care by Manure, and by Tillage: there is no Crop for which we dreſs the Ground in nearly ſo laborious, or nearly ſo expenſive a Manner; and it is beyond a Doubt, that if we would follow their Example in taking a great deal of Care of it, and beſtowing, if not ſo much as they did, yet a ſufficient Expence and Labour upon it, we ſhould reap proportionable Advantages.

We can perceive that with all their Expence, they had not the right Knowledge of its moſt advantageous Culture; they always ſowed it thick, which, by what we ſee in Experience, muſt have had a very bad Effect.

The Root of Lucerne being large, is enabled to ſupport a large Head of numerous Stalks; and this is the Method by which it will be moſt ſerviceable to the Farmer. Now this can only be promoted by its ſtanding at a Diſtance one Plant from another. On this depend the great Profits ariſing from Lucerne, and this the Antients had not; nor can we have, in the common Method wherein it is propagated here; for all our Farmers that have tried, have run into the ſame Fault with the Antients: they have all ſown it ſo thick, that the Plants have ſtarved one another; and inſtead of a Field covered with a due Number of flouriſhing and vigorous Heads of it, they have continually an innumerable Multitude of ſmall poor ones.

For this Reaſon it is eaſy to ſee, that the Drill and Horſehoeing Method muſt be fitter for this than for the common Method; becauſe that Way the Plants will ſtand remote, and they will be vigorous: this will alſo be farther promoted by the Horſehoeing, in a manner which it can be no Way elſe. It is to theſe deep rooted Plants, that Method of Culture is moſt particularly adapted. They ſpread at a Depth under the Ground by Means of very large and numerous Fibres; and the deep Plowing between the Rows by this Practice, breaks the Earth about them while growing, which can never be done any Way elſe.

We know by all Experience, the Benefit of breaking and dividing the Ground while Plants are in it, and by this Means it can be done at Times during all thoſe Years the Lucerne ſtands upon the Ground; and will always have its Effect.

The keeping a Crop of Lucerne in this vigorous Condition, is of more Benefit than in any other Caſe. It is in a Manner particular to this Plant, that as ſoon as mowed, it ſends up new Shoots in Abundance, from the Boſoms of all the Leaves; that is, the Place where they join the Stalks; and from the Part juſt below, where the Scythe cut off the Top: theſe are much more quick in Appearance, and more numerous than in any other Field Plant, and they furniſh an immediate ſecond Crop.

This, tho' an Accident in Nature, is yet greatly to be promoted or retarded by the Growth of the Plant in a more or leſs vigorous Manner; and this will depend upon its Diſtance, and its Manner of Culture. In the common Method of Huſbandry it is too cloſe to be well nouriſhed naturally, and there is no Poſſibility of Arts comeing in to its Aſſiſtance: in the other Method, the Plants ſtand clear, and the Hoe Plough ſupplies them continually with new Stores of Food: therefore in this Way, the ſhooting of a new Crop will be almoſt inſtantaneous. The French have introduced this Method of Huſbandry into their Fields of Lucerne, from the Writings of Mr. Tull, our Countryman; and they boaſt of its Succeſs. It is a Reproach to us that others have the Advantage of Labours undertaken in vain for our Service.

It is from this ſudden and ſtrong ſhooting from the old Stalks, that the Lucerne yields ſo many Crops, we ſee Clover will very indifferently afford them; two is all it can be made to give with full Advantage; and from Saintfoin, the beſt Practice is to take but one a Year. On the contrary, the Lucerne yields at this Time ſeven Crops a Year in the South of France, and all large ones; and in other Places where it is cultivated, five or ſix according to the Advantage or Diſadvantage of Seaſon or Situation: in England we may, by the Horſehoeing Huſbandry, render it capable of producing more than will be eaſily credited by thoſe who have not Experience of the Nature of this Plant, and the Effect of that Cultivation.

It is no wonder that in England this Plant has not hitherto ſucceeded to the full Effect whereof it is capable; becauſe the very Advantages of our Soil and Climate, when proper Care is not taken, otherwiſe make againſt it.

Wherever Lucerne is planted, the greateſt Danger that can attend it, is the Growth of common Graſs amongſt it. The Lucerne always declines as this advances; and by that Time it comes to ſpread and turf, the Crop will be good for nothing.

There is no Country where Graſs is more univerſal, or where it turfs ſooner than in England; therefore no Place where a Crop of Lucerne would be likely to be ſo ſoon over-run and deſtroyed; but then by the Drill and Horſehoeing Huſbandry, it is very eaſy to prevent this Accident; and then that Moiſture of the Ground, and mild Temperatnre of the Air, which would encourage the Graſs, will alſo very happily forward the Growth of the Crop.

The good Crops of Lucerne in France and Italy, are, in a great Meaſure, owing to the Sun drying up the natural Graſs: when there happen any conſiderable Rains there in Summer, the Crop is poor; with us therefore there never could be expected a good one, if we could not prevent this Accident, but it is plain by the Horſehoeing Huſbandry we may. In the Endeavours that have been hitherto made to raiſe it, People knowing the Danger to which it was liable from the Growth of the Graſs, have ſowed it thick, that it might ſtarve the Graſs that ſhould attempt to riſe among it. The Antients followed the ſame Practice, and gave the ſame Reaſon for it: with them the Error was not of ſo bad Conſequence, becauſe they prepared their Land ſo richly; but with us it is always deſtructive, for its ſtarves itſelf when ſown thus thick; and being ſtarved, the Graſs grows more eaſily among it.

We have ſeen many Trials made in this Manner, and all unſucceſsfully: the natural Graſs has grown up among the Crop, and continually gathered Strength; and the other has proportionably declined; till in a very few Seaſons a Paſture of Lucerne has been changed into one of common Graſs, with only juſt as much of the Lucerne as would ſerve to ſhew it once grew there. As the Lucerne draws its Nouriſhment deep, the upper Part of the Ground will always ſupport Graſs; and in England, whereever Graſs can be ſupported, it will grow; and wherever it grows among Lucerne, it deſtroys the Crop. Nothing but the breaking up the Ground about it, while growing, can prevent this Accident; and no Method of Culture, but that by the Drill and Horſehoe, admit this: it is very plain to Reaſon therefore, not only that this Method will ſuit Lucerne better than any other, but that it never can be raiſed advantageouſly in England any Way elſe.

In France and Italy they plow between the Rows, where it is leſs needful: there is double Reaſon why we ſhould do it here. In thoſe Countries it ſerves but one Purpoſe, which is breaking and dividing the Ground to ſupply the Plants with Nouriſhment; but with us it will anſwer two, and thoſe equally important; the giving Nouriſhment to the Plants, and deſtroying the Graſs.

The Seaſons in England, when this Crop is properly managed, favour it even under the ſame Condition in which they hurt it in thoſe Countries where it is moſt propagated: our hotteſt and dryeſt Summers will never damage it, when cultivated by the Horſehoeing Huſbandry; for the Wet will ſupply it with Nouriſhment, which the Earth broken by the Hoe, will be ready to detain for its Service; and the Heat of our warmeſt Weather will only be ſerviceable to it; and it will find Food in the drieſt, when the Ground is open, as it is thus made to the Reception of the Dew.

As to the Cold of our Winters, that is not to be feared; becauſe Experience ſhews us, that Lucerne will live and thrive where many of the Garden Plants, that ſtand the Winter with us, periſh: ſo that if it can bear a colder Winter than our own, it will be ſafe from Injuries in ours; and from this, and all other Conſiderations taken ſeparately firſt, and afterwards together, there is Reaſon to believe that England

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is a Country where this Plant may be raiſed as advantageouſly, as in any upon the Earth: there only requires a proper Method of Culture, and that Method is the Horſehoeing Huſbandry, which has been long practiſed elſewhere; and which Mr. Tull, from the Succeſs he ſaw attend it in other Countries, brought into England.

CHAP. XXI.

Of the meſt proper Soils for Lucerne.

LUCERNE we have obſerved, will grow on a poor or rich Land: the Romans of old gave it the richeſt Soils they had, and improved them moſt; and at preſent we ſee it grow very well in France upon ſome very poor ones, with no great Expence of Culture, but under the Advantage of the Horſehoe: what there is in the Ground moſt favourable to it is Warmth, and a due Depth; what is moſt injurious is a bad Bottom: it is eaſy to conceive, that a Plant which roots ſo deep, is affected by what lies below the Surface; and this has been the Reaſon why it has failed in ſome Parts of England, where its great Deſtroyer, the Graſs, has not been very troubleſome. I have ſeen tolerable Care uſed about it, and yet it has not throve; and, upon examining, have found under the Soil a Bed of tough Clay: this is an Under-ſtratum very diſadvantageous to many Growths, but to none ſo much as to Lucerne; for it detains Water about the Roots, and at the ſame Time chills it; ſo that many of the Plants die, and the reſt dwindle away.

A ſevere Winter will deſtroy a Field of Lucerne which has this Diſadvantage, while one that is not under this Check, ſhall not loſe a Plant.

As Lucerne is a Native of a warmer Climate than ours, we ſhould give it our warmeſt Soils. A very good Loam, with a large Portion of Sand, and of mellow Earth among it, and with very little Clay, is the moſt favourable Soil of all for us: next to this may be accounted that dry crumbly Earth we have in many Parts of Buckinghamshire, which is a Compoſition of mellow Earth and Sand; after this a warm, and not over-barren Gravel is to be preferred; and, laſtly, any ſandy Soil that has ſome Degree of Richneſs; for it will not proſper in abſolute Sand.

Of all theſe Soils the gravelly is found to ſucceed beſt, in the particular Effect of ripening the Seed of Lucerne; and, in general, ſuch Places as are too moiſt from frequent little Springs are worſt, though their Soil be ever ſo favourable.

This is an Article in which we ſee a great deal of Difference with Reſpect of Climate, too much Water is deſtructive of this Plant in England; whereas in France and Italy, it never ſucceeds ſo well as when near the Banks of Rivers and Springs; but there the Heats are greater, and it therefore requires more of that Refreſhment. Though we do not recommend that tedious and expenſive Method of Culture, which was given to Lucerne of old; yet we ſhall adviſe the Farmer who intends to plant it on a poor Soil, to enrich it according to its Nature, with any of the Manures moſt agreeable to its Kind. Of theſe we have treated in their proper Place. He ſhould thus prepare the Ground for the Plants; and when they are on it, he may, if he pleaſe, occaſionally refreſh them with a little more.

This Doctrine is not agreeable to the Syſtem of thoſe who would have the Uſe of the Hoe Plow ſuperſede that of Dung. We have ſaid already, that no Method of Culture anſwers ſo well as this for Lucerne, nor indeed can it be raiſed beneficially by any other Method in England; but we adviſe the aſſiſting this Practice with Manures for the Sake of frequent Crops, theſe depending upon the quick Growth of the Shoot after Mowing.

CHAP. XXII.

Of the ſowing of Lucerne, and managing it in the Ground.

THE Antients, after their great Preparation of the Land, ſowed their Lucerne in the Beginning of April; at preſent they have two Seaſons for it, both in Italy and France; the firſt is in March, the latter in October. The Romans erred in ſowing it ſo very late in the Spring, becauſe there wanted Rains, and they were obliged to water it: the preſent Practice in thoſe Countries is better; and, in general, the October ſowing is the moſt profitable; the Plants having Time to root themſelves well in the Winter, and the wet Seaſon aſſiſting them greatly in their firſt Shoots.

The Difference of Climates is ſo great, that it would be very prejudicial to attempt introducing the Methods of Huſbandry from Italy into England in the ſame Form: it is very proper for our Farmers to know them, that they may perceive on what their Succeſs depends; but they muſt be here accommodated to the Climate. If we ſow Lucerne in Autumn, it will lie in ſome Danger from the Winter. However, the Farmer knowing this, may, if he pleaſes, ſtand the Hazard. Young Lucerne will be deſtroyed by thoſe Winters which will not affect it in a more eſtabliſhed Growth; and in the ſame Manner afterwards, a Field of it that is ill managed, and poor, may be hurt, when one that is in better Condition eſcapes. As to the October ſowing, the Chance is this; if the Winter be ſevere, and the Soil unfavourable, the Crop may be loſt; if it ſhould prove mild, and the Soil agreeable, the Lucerne will ſtand; and it will have got ſuch Strength, that it will make much better Head early in the ſucceeding Summer.

As we ſhall not lead the Farmer into Hazards, in the Culture of a Plant we want to introduce more generally into this Country, we ſhall adviſe him not to think of the October ſowing, but to limit himſelf entirely to the

Spring, and to wait till very late in that Seaſon, that the Danger of the Froſts may be over.

We have blamed the Huſbandmen of Italy, for deferring their Spring Sowing of Lucerne till April; but we ſhall recommend that very Practice to the English, and adviſe the defering it here till toward the Middle of that Month.

The ſowing it earlier, may, in ſome Years, ſucceed better; but this depends upon the Accidents of the Seaſon, and we would not have the Farmer liable too much to them in a new Undertaking. If it ſhould be ſown in March, and a mild dry Time follow, it would be better than later; but of this no-body can be ſure: and, in other Caſes, the Expectation of a Crop are eaſily deſtroyed two Ways; for if a great deal of Wet ſhould come ſoon after Sowing, it will rot the Seeds in the Ground; and if Froſts of any Power follow the Time of its coming up, they will utterly deſtroy the Crop.

The Quantity of Seed to be allowed to an Acre, is a Thing to be determined by Experience; but the Way of ſowing it by the broad Caſt, which has been the Cuſtom in moſt Parts of England where this Plant has been tried, is by no Means proper on any Account; and a vaſtly larger Quantity of Seed than needful has always been allowed. The Method we propoſe by the Drill, will eaſily determine the needful Quantity of the Seed. The Plants ſhould ſtand at about ſeven Inches Diſtance in Rows, and theſe Rows ſhould be at a Yard diſtant one from another. It will be poſſible to work the Horſehoe in theſe, and the Plants will be perfectly well ſupplied with Nouriſhment. The Farmer need not be afraid of having by this Method, a ſufficient Quantity of Plants upon the Ground; for each of theſe, if rightly managed, will, when grown to Perfection, have from a Hundred to more than two Hundred Stalks.

When the Lucerne is ſowed thin in Drills at a Yard Diſtance, in the Middle of April, upon a proper Soil well broke for that Purpoſe, the Moiſture and Warmth of the Seaſon will ſoon bring it up. As ſoon as it has got a little Height, the Farmer is to ſend in ſome Hand Hoers, with Inſtructions how to work. They are to hoe up the young Growth of Weeds that have riſen about the Rows on each Side, and to thin the Plants where they have come up too thick, leaving the moſt promiſing at the Rate of about four in every two Foot. They are not to thin theſe to exactly ſix Inches Diſtance each, but to preſerve the beſt Plants in about that Number. Theſe Hand Hoers are not to meddle with the Middle of the Intervals, but only to deſtroy the Weeds, and break the Surface of the Ground juſt about the Rows.

This done, the Plants are to be left to themſelves till they are of ſome Stature, and the Intervals are over-run with Weeds. Then the Hoe Plow is to be ſent in, and a tolerably deep Furrow is to be turned in the Centre of each Interval.

This is to be repeated as often as the Weeds appear, only leaving here and there an Interval free and unplowed for the Convenience of makeing the Hay.

The Intervals that are left at one Time may be plowed up at another; but in that Caſe there muſt be a Number made ſmooth by Rolling at proper Diſtances.

By this Management Lucerne will thrive very well till Graſs begins to grow among it, which it is always apt to do, and always as we have ſeen to the Deſtruction of the Crop.

In this Caſe there muſt be a good Furrow plowed from each Side of every Row; and afterwards there muſt be Harrows brought in to the Ground, and drawn croſswiſe; theſe, without injuring the Crop, will tear away the Graſs which the Plow raiſed, and ſuch as grow among the Plants; after this, the two Furrows firſt plowed up, beſide each Row, are to be turned again upon them; and there will be the double Advantage of clearing away the Graſs, and giveing the Roots of the Crop a fine Quantity of freſh Earth for their Nouriſhment.

The Graſs that was left upon the Ground, and half killed by the Sun, will be thus buried and thoroughly deſtroyed; and after this it will not be able to make any Head again for a great while.

As to the thinning of Plants in the Rows by the Hand Hoe, it muſt not be done till they have got ſome Strength, for fear of Accidents. The Sweetneſs of the Lucerne Leaf, when very young, makes it liable to the ſame Damage by the Fly as Turnips, therefore it is proper to ſee that Danger over before it is thinned; for when the Plants have got ſome Strength, this Inſect never attempts them.

As to the Horſehoeing afterwards, it is to be repeated oftener than to any other Species whatſoever, for this plain Reaſon, that it is to forward ſo great a Number of Crops. Thoſe who have hitherto raiſed Lucerne in England, following the common Method of Huſbandry, have contented themſelves with two Crops a Year: but we ſee what it yields in other Countries, and by the ſame Management we may bring it nearly, if not altogether to, the ſame Richneſs here.

If the Farmer ſhould at any Time have neglected his Lucerne, ſo as that the natural Graſs ſhould become a Turf, and the Plants appear, as in that Caſe they certainly will, in a decaying State; the four coultered Plow is then the Inſtrument for his Purpoſe.

This we have deſcribed in its Place, and ſhewn in what Manner it breaks and tears a Turf to Pieces, be it ever ſo tough and thick: with this he is to go round every Row, turning the Furrows toward one Row, and from the next, the firſt Time; and the next, from the Rows they were turned toward before, and to the others: thus taking Care not to hurt the Plants by letting the Furrows lie too long upon them, the Graſs will be deſtroyed, and the Plants will recover.

In this Caſe there muſt be ſome Intervals left as in the common Courſe for the making of the Hay; and by this Practice there will be found no Difficulty of making this moſt valuable Plant ſucceed perfectly well in England, and afford its numerous Crops as in other Countries.

CHAP. XXIII.

Of the Value of Lucern, and Manner of uſing it.

THE Superiority Lucerne has over all other of the artificial Graſſes, is in the Frequency of its Crop; this gives it a Value to the Farmer which none of the others have; and it is encreaſed by its natural Richneſs, and wholeſome Qualities.

The others are to be uſed partly by cutting, and giving them green in the Racks, partly by drying into Hay, and partly by feeding on the Ground; Lucerne would equally anſwer all theſe Purpoſes, but it is better to ſpare the laſt, for the Feet of large Cattle would tread it down in ſuch a Manner, that the Owner would loſe much more in his ſucceeding Crops, than would equal the Advantage of that Feeding. In the other two Methods it anſwers excellently, and a Part of it may be given freſh cut and green all the Summer, while the reſt is making for the Winter Service, or for Sale.

The beſt Seaſon for giving it firſt to Cattle green, is in the Spring, becauſe its natural Effect is purging firſt, and afterwards fattening them; but in this, as in Clover, there is ſome Danger of its making them ſwell at firſt, if given injudiciouſly: to prevent this Accident the Farmer will remember what we have ſaid of Clover, and uſe the ſame Precautions, giving them Straw among it firſt, or beginning by a little at a Time.

In this Way of giving it is ſafe for all Cattle, and agrees with all; nothing ſtrengthens or fattens a Horſe like it, and no Food whatſoever makes Cows yield ſo great a Quantity of rich Milk, or ſo little alters it in Flavour.

The great Danger of Cattle's hurting themſelves by it, will be avoided by their not being turned into the Fields, to eat at their own Pleaſure: this is always to be given them in Racks, and therefore the Owner may always proportion the Quantity at his Diſcretion.

In this Manner of uſing, a Field of Lucerne will continue in Heart many Years, nay there is no ſaying when it will be worn out.

The making it into Hay is the next Conſideration, and is of the greateſt Conſequence. The Profit is vaſtly great, and therefore it is worth the Farmer's while to be ſtrict in obſerving all the Particulars relating to it.

The principal are two, that it may be cut young, and that it may be well dried; as to the firſt it is prodigiouſly to his Advantage in every Reſpect, for the Hay will be ſweeter, and the next Crop will come much ſooner than if more Time were loſt, and the Roots exhauſted, as we have ſhewn they always are, when the Plants have ſtood to flower ſome time.

The Time to cut Saintfoin is when in full Flower; the Time to cut Clover is when beginning to get into Flower; but the exact and proper Time for cutting Lucerne is when it is preparing to flower, but has none fully open.

The Flowers of this Plant ſtand in Heads, in the ſame Manner as thoſe of Clover, but the Plant muſt be watched carefully for their Appearance. When they have formed themſelves is the Time of cutting the Crop; and in that Caſe, the Roots being full of Vigour, there will be a Shoot of four or five Inches high toward a new Crop, while the Hay is making.

There is no appointing the certain or exact Times of mowing the ſeveral Crops of this Plant, but it will be eaſily found by Obſervation; the firſt muſt be cut as ſoon as the Plants are in this Condition; and the others as they ſucceſſively get into the ſame State again after every mowing. This has all the Advantage poſſible. The Stalks of this Plant grow ſtubby and hard, when it ſtands too long; but they are by this Means cut while it is very tender; the Cattle are fondeſt of it when it is cut in this Condition; it leaves the Roots the ſtrongeſt, and the next Crop in Conſequence follows quickeſt; and being cut in the ſame Manner, when juſt getting toward Flowering, ſerves in the ſame Way the Farmer's Purpoſes beſt, and makes Preparation for the next in Succeſſion. Thus the Field of Lucerne, properly managed, yields from time to time, during the whole Summer, ſucceſſive Crops, and all very large ones, of an excellent Hay; and with Reſpect to the Horſehoeing, the oftener that is repeated the quicker the Crops will follow one another, and the more plentiful they will be.

While the Lucerne is in this proper Condition for cutting, the Stalks are ſingle, upright, and of a pale Green: after this, when the Flowers begin to open, they become branched and grow yellow, and then they ſoon will be ſticky, taſteleſs, and unprofitable. Therefore the Farmer's Intereſt is every Way concerned to ſeize upon the proper Time.

When it is cut the Mowers muſt have one general Caution, to keep their Scythes very ſharp, and to go on evenly and regularly throughout the Ground, for on the Smoothneſs of the Top depends, in a great Meaſure, the quick and numerous Springing of the Shoots for a ſucceeding Crop.

When mown it is to be ſpread upon thoſe Intervals left plain, or rolled ſmooth for that Purpoſe, and very carefully turned and dried. It requires a more careful Management in this Reſpect than either Clover or Saintfoin, for it is more apt to damage afterwards. It is in this Reſpect very apt to deceive the Farmer, for it will ſeem dry when it is not thoroughly ſo, and in this Caſe will be very apt to get damage afterwards, and ſo ſpoil the Hay of other Crops that happen to lie near it.

As to the Seed, that is uſually imported from FRANCE, but it is poſſible to bring it to Ripeneſs here; for this Purpoſe a warm dry Gravel, well expoſed, is to be choſe, as we have named before; and the Plants are to be thinned to a greater Diſtance. They will thus riſe into large and very numerous Stalks, and theſe muſt not be cut down at all, but left to follow the Courſe of Nature: their Flowers will thus appear in great Abundance, and after them the Pods, in which, if the Seaſon be favourable, the Seeds will ripen

to

to all the Perfection of ſuch as are brought from Abroad.

CHAP. XXIV.

Of Hop Trefoil.

WE have before ſpoken of the Uncertainty there is in the Huſbandmens expreſſing themſelves, concerning the Plants they cultivate. And this is another Inſtance: many of them call this Plant Trefoil, and others three leaved Graſs, and then ſpeak of its Culture or Uſes without any farther Diſtinction. This is the Caſe with the Writers on Huſbandry, as well as thoſe who practiſe it, and in them it is by much the moſt unpardonable. When they propoſe to inform the Ignorant in the Uſes and the Management of a Plant, from which a profitable Crop may be raiſed, 'tis very fit they ſhould firſt inform them what the Plant is: this they think they have done when they have called it Trefoil, or three leaved Graſs, not knowing, or not conſidering, that theſe are the Names of no particular Kind, but of all thoſe Plants which bear three Leaves on a Stalk. Trefoil is the Name of Clover, and of all the other Plants of this three leaved Kind, therefore there requires more Diſtinction. The Plant cultivated under the Name of Trefoil in certain Counties of ENGLAND, may be very well known under that Name, improper as it is, in thoſe Places; but the Inhabitants there do not want the Information: he who writes does it, or ſhould do it, for the Service of all Perſons: thoſe to whom he can be moſt uſeful upon that Head, are ſuch as live in Counties where the Plant he treats of is not cultivated, and who, by this Means, may bring it into Uſe there. Theſe can never get any Information what the Plant is by ſuch a Name, and it is needful to diſtinguiſh it by one more particular, and to eſtabliſh that Name by a Deſcription. This is the Courſe we have followed in the preſent Work, and ſhall continue in every Inſtance.

There are a great many Kinds of Trefoil, or Plants which have the Leaves always three on a Stalk, or three at a Joint, and theſe are all called by the Name Trefoil, but with the Addition of ſome Word, by which the Kind is diſtinguiſhed; one of theſe is the Trefoil, ſimply ſo called by the Farmers, and raiſed like the other artificial Graſſes for feeding their Cattle; the particular Diſtinction of this is, that the Flowers grow in ſmall Heads, reſembling a Hop in Shape, and from this it has been called Hop Trefoil, or Hop Clover, and in Latin Trifolium Lupulinum, which means the ſame. But as there are more Kinds than one of this Hop Trefoil, the largeſt is that choſen for Culture. Under this Name the Plant will be found treated of by all who have written on Herbs, and the Farmer knowing it by this Name, will always be able to inform himſelf and others about it.

This, though the largeſt of the Hop Trefoils, is but a ſmall Plant in Compariſon of moſt of the former, but it grows thick, and makes Amends for the Want of Height, by the Number and Quantity of its Stalks.

The Root is whitiſh, ſlender, and hung with Fibres; the Leaves ſtand three together, and are ſmall, oval, of a pale Green, and very numerous; the Stalks are eight or ten Inches high naturally, but they may be made taller by careful Management; the Flowers are ſmall and yellow, and they ſtand in oval Tufts or Buttons, which in a certain State much reſemble Hops: the Seeds follow, and are contained in dark coloured Huſks, and ſtand in a Head or Cluſter of the ſame Form.

This is the Hop Trefoil cultivated by the Farmer. It is a Native ENGLISH Plant, and therefore ſtands excellently all Weathers, and all Seaſons: for the ſame Reaſon it ſows its Seeds, and continues itſelf upon the Ground better than any of the foreign Kinds, and is up earlier in the Spring; this gives it a very conſiderable Value with the Farmer. The Plant that is ſure to be up early, that is too hardy to be hurt, and that gives a good, ſweet, and wholeſome Food to his Cattle, when he can ſcarce get it any where elſe, muſt needs be very valuable.

This was one of the firſt Improvements made by the ENGLISH Farmers, in the Way of the artificial Graſſes; but ſince the Introduction of the others it has been leſs regarded, though on many Accounts it is very valuable, and ought always to be in his Remembrance, as one of the many Crops by which he may vary his Courſe to the Eaſe of his Land, and his own great Advantage.

The Soil that ſuits the Hop Trefoil beſt, is a ſoft mellow Earth; next to this it proſpers in a light rich Loam: it will grow on almoſt any Ground, but beſt on theſe; and worſt of all on ſuch as are clayey or wetiſh. The Farmer who has a dry Piece of Ground, and has a Mind to a Crop of Hop Trefoil, need not ſcruple ſowing it let the other Condition of the Ground be what it will: he will have a better or a worſe Crop according as the Soil more or leſs ſuits the Plant, but he will never fail of having enough to anſwer his common Purpoſes. Hop Trefoil may be ſown alone or with Corn, in the ſame Manner as Clover, and in either Caſe will ſucceed very well; it has alſo a third Uſe, which is, the propagating it in common Paſtures. This is done by ſprinkling the Seed among the Graſs, where it freely comes up along with it, and greatly thickens it and improves its Quality.

When Hop Trefoil is ſown in the Field, whether alone or with Corn, it may be ſown either in the Huſk or naked; this is a Circumſtance to which the Farmer muſt attend with Care, otherwiſe he may be led into great Errors; the Quantity proportioned to an Acre differing very greatly, as the Seed is clean or with its Huſks. Different Soils may make ſome Variations needful, in Reſpect of this as of all other Seeds; this is a Subject we have conſidered before, and as it holds good in all Crops need not be repeated; but for a general Rule we ſhall tell the Huſbandman, that if he ſow the Seed naked and clean, he is to allow twelve Pound Weight of it to an Acre; and if in the Huſks he is to meaſure it, and allow to the ſame Quantity of Ground two Buſhels.

He will by this Diſtinction have ſome general

Gueſs alſo, at the Meaning of thoſe practical Writers, who are leſs nice in their Explanation than Practice requires; when he reads of Trefoil Seed by Weight, he will know it is meant of the clean Seed; when by Meaſure, of that in the Huſk.

Knowing the Soil and Quantity of Seed, the next Thing is the Manner of ſowing. As this is a Plant never expected to grow large, we ſhall not recommend the new Method of Huſbandry for it, but adviſe the Farmer to ſow it at Random, in the broad Caſt-way; and for many Reaſons ſhall prefer the Seed in its Huſks, rather than naked. This defends it from Injuries by Inſects, and from Damage by wet till it ſhoots, it makes it ſpread eaſier from the Hand, the Quantity being larger, and it ſhoots the quicker for it. This was the Intent of Nature, for the Seed falls to the Ground Huſk and all; and we ſhould be wiſer than we are, if we took Pains to follow her Inſtruction and Example in more Inſtances.

The Farmer thus ſowing two Buſhels of the Seed, Huſk and all, by the broad Caſt-way, will have a thick promiſcuous Crop early up; and it will, while it ſtands, be continually thickening itſelf more by the ſhedding of its own Seed, which never fails to grow in Abundance; it will do this even when eaten upon the Ground, the Flowers being very numerous, and ripening in ſuch a Succeſſion, that there are always ſome Heads ready to ſhed their ripe Seed, let the Condition be what it will; but if it be let to ſtand for Hay there will be Millions of new Plants.

There are two Seaſons for ſowing this Trefoil, Autumn and Spring, in either of which it may be ſown according to the Farmer's Diſcretion, either alone or with his Winter or Summer Corn; but when the Choice is equal in other Reſpects, he may be ſure it will always ſucceed beſt ſown alone.

The Earth requires no great Preparation for this Crop, for the Plant being wild will grow any Way; the only Information that need be given the Farmer on this Head is, that the Seed will not grow if it be buried too deep. This will ſerve him to a double Purpoſe, firſt in inſtructing him to ſow it in ſuch a Manner, that it may be lightly covered; and afterwards to bury it by deep plowing, when he intends another Crop; for without this Care it will riſe among the Corn when not intended, and often be very prejudicial to it.

For ſowing Hop Trefoil the Farmer ſhould chuſe a calm Day, eſpecially as we have adviſed the ſowing the Seed in the Huſks; for in this Caſe, being large and light, the Wind would take Effect upon it, and ſcatter it very unequally, however ſteady and careful the Hand were that ſowed it.

When it is on the Ground the beſt Method is to draw a Roller over it, and then to harrow it very lightly. This is more Trouble than many take, but it is not much, and the Advantage in the Crop will very well anſwer it. The Rolling alone would be ſufficient, but that if a Shower comes it looſens the Seeds, and if a windy Day follows, it ſcatters it all at Random. In the Harrowing great Care muſt be taken to do it extreamly light, otherwiſe the Seed will be too deep buried.

The Crop thus ſown will riſe quick, and increaſe in Value every Year. It requires no Trouble; but may be fed or mowed at Pleaſure, and the beſt Management is to do both at the proper Times. It is hardier than any of the others, and leſs liable to any Kind of Damage: Cattle are very fond of it when cut and given them freſh in Racks, but they may be turned into the Field almoſt at any Time without Hurt. Of all the Plants of this Kind none is ſo wholeſome as the Hop Trefoil: ſome have found this ſo frequently by Experience, that they always ſow a Proportion of it among Clover, to prevent the Effect of that Plant, in ſwelling and diſordering the Cattle that eat it. They grow very well together; and the right Proportion is five Parts of Clover Seed, and one of clean Hop Trefoil.

The early Appearance of this Trefoil is of great Service to the Ewes and Lambs in Spring, and alſo to Cows and Oxen: it is therefore a Crop the Farmer ſhould never be without, in larger or ſmaller Quantity.

The greateſt Inconvenience attending it, is what we have named already, that he often finds a Difficulty to clear the Ground of it when intended for ſomething elſe; but we have given the Method of doing this effectually: it is only to bury it by a deep Plowing, for neither the Seed nor Root will grow when they are covered to any Depth.

CHAP. XXV.

Of Ray Graſs.

WE have ſeen the Farmer calling many of thoſe Plants which he ſows for anſwering the Purpoſes of Graſs, by that Name, though of very different Kinds; but this Ray Graſs is properly a Graſs only of a particular and valuable Kind. Its Uſe is the ſame with that of the ſeveral Kinds laſt mentioned, the ſowing for an early Food for Sheep and other Cattle, and none anſwers the Purpoſe better. It is hardier than any, and having the Appearance, and with it the Nature of the better Sort of the common Graſſes, it is the moſt eaſily propagated of any. It is hardier than the Hop Trefoil, and comes in even earlier than that to the Farmer's Service.

We have obſerved, ſpeaking of Paſtures, that there are a great many different Species or Kinds of natural Graſs, differing in greater or leſſer Particulars among one another. Ray Graſs is one of them, its proper Name is Darnel, in Latin Lolium. There are two Kinds of it, the white and the red, ſo called from the Colour of the Joints of the Stalks, which in the one are white, and in the other reddiſh: this is the Diſtinction as to Colour, but they differ in Size and Qualities. The white is the larger, and the red is the hardier of the two. They are both wild Kinds, but it is a great Advantage to the Farmer to ſow them, the red or ſmaller Darnel is the beſt Kind, becauſe it is earlier and hardier than the other,

other: and ſends up more numerous Leaves. The Farmers who do not underſtand Names much, and they have in this Article, for want of ſuch Knowledge, let in ſome Confuſion. We have obſerved the proper Name of this Graſs is Darnel. It is called Ray Graſs, and this ſome write Raye Graſs, and others, according to their Notions of ſpelling, Rey Graſs. This Rey has been ſpoken as if it were Rye, and thence others have written it Rye Graſs; now Rye Graſs is an English Name of another Graſs, one of the worſt and moſt unſerviceable of all the Kinds; it grows by Way Sides, and has a bearded Ear reſembling that of Barley: this, inſtead of being cultivated for Uſe, ſhould be rooted up as a Weed wherever it comes: yet this ſeems to be directed to be ſown and cultivated, by thoſe who write the Word Ray Graſs in that Manner.

The Graſs properly called Ray Graſs, and meant in this Place, is of a middle Stature among the Graſs Kinds, growing to a Foot and half high. The Root is a Tuft of thick and very many whitiſh Fibres: the Leaves are very numerous, and of a freſh Green, they are narrow and ſharp pointed, like thoſe of common Meadow Graſs, but ſhorter.

The Stalks are very numerous, and riſe among the Leaves; they are round, green, firm, and toward the Bottom very much jointed. The Top of each Stalk is covered with a Kind of Ear. This is long and thin, and is compoſed of ſeveral little Cluſters of Huſks, repreſenting ſo many little Ears going to make up the great one. In theſe are contained the Seeds, which are not unlike the Grains of ſome of the Corn Kind in Shape, but ſmaller.

This is the Deſcription of Ray Graſs in its natural wild Way of growing, and in which it is common about Foot Paths and in Paſtures, naturally growing in a ſcattered Way in many Places. It does not ſhew much Difference by Means of Culture. The Leaves are more numerous when it has a good Soil, and the Stalks, if permitted to riſe to their Height, will be much taller; but this is not the Farmer's Intereſt, for as they grow large they grow hard, and are leſs uſeful.

Ray Graſs may be ſown either alone or mixed with Clover, or other of the artificial Graſſes, as we have ſhewn in treating of them; and this is the beſt Way of managing it.

Any Soil will ſuit Ray Graſs, and this is a great Advantage. We have been obliged to caution the Farmer, againſt ſowing ſeveral of the laſt-mentioned Plants upon clayey or wet Soils, becauſe they will not ſucceed thereon; but this is a Graſs for Land that will ſupport no other. Ray Graſs will grow to Advantage on cold, wet, ſpewy, and ſower Land, and is therefore a very great Improvement.

There are Crops intended for the Food of Cattle, which are deſtroyed by a very dry Summer, or at beſt rendered of little Uſe or Value; but this is not the Caſe with Ray Graſs, no Drought of Summer, and no Froſt or Wet of Winter hurts it: the Farmer therefore ſhould always have ſome Land ſown with it, becauſe it will ſtand him in ſtead when all the reſt fail. It is one of the beſt Winter Foods for large Cattle, and one of the earlieſt Spring Foods for the ſmaller, and at the ſame time there is none more wholeſome: it not only is excellent itſelf, but, as we have before ſhewn, it ſerves to correct the bad Qualities of the others.

Ray Graſs feeds Horſes in a very hearty Manner, and is of ſo dry a Nature that it will prevent the Rot of Sheep.

No Field will bear ſo large a Stock as one of Ray Graſs, becauſe nothing can hurt it; nor is there any Harm, but rather Advantage in eating it very cloſe, becauſe the worſt Damage that can attend it, is the growing too high. The Stalks are as tender and full of Nouriſhment as the Leaves when young, and they grow up immediately after biting.

When the Farmer ſows Ray Graſs with his Clover, for the Sake of correcting the bad Quality of that Graſs, a ſmall Proportion of Ray Graſs, ſuch as we have named on that Head is ſufficient; but when he intends to have the full Advantage of the Crop in feeding his early Cattle, he ſhould much enlarge the Quantity. Three Buſhels of Ray Graſs Seed is a very proper Quantity for an Acre, in a Mixture with Clover, or more may be allowed. In general, after theſe Hints, the Huſbandman will be able to proportion the Quantity to the intended Service; and as the common Cuſtom is to ſow a great deal of Clover, with a little Ray Graſs among it, he will often find it prudent, where he is to depend upon a Paſture for a conſiderable Time, to ſow it with a great deal of Ray Seed, and a little Clover.

It is the Effect of Ray Graſs to make the Clover laſt a great many Years longer than it naturally would, in whatever Proportion it be mixed with it; but if the Farmer chuſe to allow it a large Share, the Paſture will be good as long as he pleaſes. The Ray Graſs, Hop Trefoil, and Clover, will grow excellently together, where the Soil is tolerably dry; and in that Caſe there is no Way of making a richer Paſture, than by ſowing a large Proportion of the Ray Graſs, with an equal Mixture of the other two, in about an eighth Part Proportion of each to the Ray Seed.

Beſide the excellent Quality of Ray Graſs, in growing on clayey and other bad Soils, it will in a very powerful Manner, deſtroy the worſt Weeds that grow naturally in the others. It is obſerved that where Ray Graſs is the principal Growth, there are few Thiſtles, and if thoſe are but once tolerably got up, they never riſe again; the Reaſon is plain, and the Fact of great Importance. The Ray Graſs covers the Ground with ſo thick a Turf, and draws ſo large a Quantity of Nouriſhment, for the Supply after its conſtant Cropping, that no Seeds can get in, and if they do the young Plants that riſe from them are ſoon ſtarved. The keeping one of theſe Grounds free from this Annoyance, is a very conſiderable Article.

The mowing Ray Graſs is an Article that requires a great deal of Circumſpection and Conſideration, it makes a very good Kind of Hay, and its Seed falling from it, in that Condition, is of ſome Value; but here the two Points of

Profit interfere with one another, for if the Graſs be cut young the Seed will not have its full Size or Hardneſs; and if it be let to ſtand for that Purpoſe the Hay will be harſh, from the Dryneſs, Coarſeneſs, and Hardneſs of the Stalk.

In this the Farmer who would act moſt judiciouſly, ſhould take a middle Courſe, cutting down the Ray Graſs, not while the Seeds are too young to be uſeful, nor letting it ſtand till they are ripe, and the Stalk hard, but coming in when the Seeds are beginning to ripen, and the Stalk is yet tender, thus he will make good Hay, and have tolerable Seed, ſome of which, if not all, will be ſure to grow.

If he particularly want the Seed for ſowing ſome other Piece of Ground, he muſt let the Crops ſtand ſomewhat longer before mowing, and for the Sake of good Seed be content to ſpoil his Hay, in ſome Degree; on the other hand, if he have no Regard to the Seed at all, he ſhould cut the Ray Graſs juſt when the Ears are beginning to form themſelves upon the Stalk, he will thus have an excellent Hay, and the Roots being unexhauſted by Ears, will ſend up a freſh Shoot in a ſurpriſingly ſpeedy Manner, for feeding on the Ground, or for a ſecond Crop.

The Seed is not an Article of very little Conſideration, for it brings ſome Price; and when the Crop is ſuffered to ſtand for it, four Quarters will ſometimes be got from an Acre; this at about Two and Nine-pence a Buſhel, which may be called a moderate Price, is worth ſome Loſs upon the Article of Hay. Some who think of the Hay as the principal Crop only, gather ſuch Seeds as are found at the Bottom where it is put up; but in this Caſe, where a Profit is depended upon from the Seed, it ſhould be thraſhed for it in the ſame Manner as Corn: and the Hay, far from getting any Injury by this Management, will be the better.

At any Time if the Crop of Ray Graſs be thin, it may be thickened by ſowing ſome more of the Seed; if this be ſcattered at Random among the Graſs, it will take, and encreaſe the Quantity according to the Proportion uſed, which may be a Buſhel or two for each Acre. The beſt Seaſon for doing this is Spring, but it may be done in October.

This Graſs has many a Time ſaved the Farmer's Stock of Sheep and Lambs, very early in the Spring, from ſtarving; and at all Times it is an excellent Preparatory for the richer artificial Graſſes which riſe, in Point of Time, after it.

Some have ſuppoſed what is called Long Graſs in ſome Parts of Wiltshire, to be the ſame with Ray Graſs, but it is a great Error, that is a Kind of Water Graſs, with very long Stalks, which will grow but in few Places: it is very uſeful where it will take, but it requires a rich Soil, and a proper Degree of Moiſture, ſo that it is in vain to think of making it univerſal. This Kind ripens its Seed but poorly, which is the Condition of many other Plants that creep abundantly at the Root, Nature having given that as the Means of their Propagation, and therefore leſs regarding the other. When the Farmer ſhall happen to have a rich wettiſh Piece of Meadow Ground, he may at any Time try this Species in it. 'Tis always to be found about ſhallow Waters, and may be known by the Length of its Shoots, which trail along the Sides, or float upon the Surface. Theſe being ſtuck into a damp Ground, already covered with other Graſs, may take their Chance: if they meet with a Soil, and all Accidents proper for them, they will thrive and be very uſeful, if not there is no Harm done by the Tryal. It is worth making in this Way, becauſe attended with little Expence or Trouble; if it do not ſucceed 'tis vain for the Huſbandman to attempt raiſing it by Seed, for of that little comes to ſuch a Ripeneſs on the beſt nouriſhed Plants as to grow; and if it were ever ſo vigorous, without the Particularity of juſt a right Soil, it will come to nothing.

The Place where this Graſs was firſt obſerved by the Farmers, was a Piece of Meadow Ground near Maddington, a few Miles from Salisbury; and the Effect of it being ſeen in that Place, they endeavoured, but without Succeſs, to propagate it in ſome others. The Stalks in this Meadow grow to the Length of eight or nine Yards, rooting at every Joint, of which there would be twenty or more in ſuch a Length, and it proved an excellent Food for Sheep. The ſame Graſs has been obſerved in other Places, and always remarked for its great Length: Sheep in particular are fond of it; and they will eat it greedily as it grows about Waters, as well as when it mixes among the other Graſs of Meadows.

With Reſpect to the other Species of common Graſs, numerous as they are, none thinks of cultivating one more than another. In general, thoſe which moſt reſemble the common Meadow Graſs are beſt, and ſuch as are ruſhy, or have triangular Leaves with ſharp Edges, are the worſt; theſe are principally Natives of ſower Land, and watery Places. As to the Ray Graſs, when it grows natural among other Paſture Graſſes, it is always an Advantage, and we have ſhewn how it is to be raiſed to great Service by proper Culture.

CHAP. XXVI.

Of Spurrey.

THIS is a Plant very little known among our Huſbandmen of the preſent Time, and not to be ranked with many of the preceding in its Utility; however, as it was once ſown in our Fields, and is at this Time propagated in Flanders, and ſome of the Neighbouring Kingdoms; and as it is not without its Uſe, we have thought it not unworthy a ſhort Chapter, at the End of this our ſeventh Book, treating of thoſe Plants of Graſs or other Kind, which are raiſed for the Service of the Farm as Food, at Times when other Species are wanting.

Spurrey is a wild Plant in this Country, and therefore will not fail to ſucceed eaſily with any Kind of Culture; as it naturally grows in

in our Corn Fields, it ſhews that Tillage will always be uſeful to it; and as it will grow in very poor Ground, and come into Service late in the Year, when many other Crops are eaten, it is worth ſome Notice.

It is a ſmall weak Plant, with little five-leaved Flowers, and a great Number of Seeds following each in a Kind of Capſule. There are five Kinds of it Natives of England. 1. The larger or common Spurrey, frequent wild in Corn Fields. 2. The little annual Spurrey, with foliated Seeds. 3. The common little red flowered Spurrey, wild in dry Places. 4. The Sea Spurrey, frequent on our Sea Marſhes. And 5. The leſſer blue flowered Sea Spurrey.

Of theſe common Spurrey, and the Sea Spurrey, the firſt and the fourth Kinds named here, are the only ones worth the Farmer's Notice; and of theſe the firſt is the only one at preſent regarded.

This is a weak Plant, with numerous Branches. The Root is white and ſmall, but full of Fibres. The Stalks are eight or ten Inches long, and divided into many Branches not very erect, tender, and of a pale Green. The Leaves are very narrow, and there ſtand ſeveral of them at every Joint: at the Tops of the Branches ſtand the Flowers, which are ſmall but very conſpicuous, being of a bright milky White.

The Soil that moſt ſuits the Growth of this Plant, is a mellow Earth, with a large Admixture of Sand; and it will thrive very well in Expoſures, and the moſt barren Places.

The Ground requires no great Care for fitting it to this Crop. There are two Seaſons for ſowing it, the firſt is in May, and the other very early in Autumn: in both Caſes it ſhoots very quick, and preſently covers the Ground with a green Coat, though in a ſtraggling Manner.

The Uſe of it is as Fodder for the Cattle, principally Cows; and the Way of giving it, in Flanders where it is moſt cultivated, is freſh cut in Racks. The Produce of the latter ſowing comes at a very advantageous Seaſon, the natural Graſs in their Paſtures having been well eaten by that Time, and recovering itſelf but ſlowly.

It is an excellently wholeſome Food, and one that Cattle are very fond of: it occaſions Cows to give a large Quantity of Milk, and gives it no ill Flavour, as too many of theſe Things will: it alſo fattens Cattle of all Kinds, and, as is ſaid, occaſions Hens to lay more Eggs than any other Food. 'Tis plain thoſe Fowls are fond of it, and at the worſt it never has been found to do them any Harm.

If the Huſbandman ſhall chuſe to cultivate this Plant, the Method he ſees is very eaſy, ten Pounds of the Seed, which may be had very cheap from Holland, is the proper Quantity for an Acre: it requires only to be lightly harrowed in, after ſowing in the common broad Caſt-way, and then will give no farther Trouble till the Time of cutting, which will be in about three Months after the ſowing.

We have mentioned among the five Species of Spurrey, one beſide this common Kind, which may be well worth the Farmer's Notice, this is that Sort which grows about our Sea Coaſts. It has not yet been conſidered as an Herb at all profitable, but this is becauſe it is not known among thoſe who ſhould bring it into Uſe. The Knowledge of Plants is confined to People of Curioſity, it will be very happy if it ever ſhall be made univerſal.

This Sea Spurrey, with which we are deſirous to bring the Farmer acquainted, is much more worthy his Notice than the other. That we have not greatly recommended, becauſe there are many other Crops, probably moſt of them ſuperior in Value to it, which will grow on the ſame Ground, and with not more Trouble in the Culture, but it is not ſo with Reſpect of this.

There is nothing we want more than to find proper Growths for our Sea Coaſt Land, and this is one that Nature has calculated for that Purpoſe. We have a vaſt deal of Ground within the Reach of Salt Water, which is therefore neglected; becauſe being impregnated with Saltneſs, things uſeful will not grow upon it: there would be a vaſt Advantage in finding Crops proper for theſe Grounds; and if they were but of a moderately valuable Kind in themſelves, ſtill, becauſe they grow on what would be otherwiſe unprofitable Land; they would be uſeful. We ſee the great Benefit of draining thoſe feeding Grounds which become Salt Marſhes, and there will be the ſame or more in raiſing Crops of uſeful Herbs, of whatever Kind, on ſuch as are not fit for that other Purpoſe.

We find many Pieces of Ground in this Condition, the Soil whereof is too looſe and ſandy to bear a good Turf. On theſe, which cannot be made to anſwer in the common Way of Sale-marſh Ground, the Sea Spurrey might be raiſed with Profit. There can be no doubt of this, becauſe the Plant grows wild upon them; and I am able to acquaint the Farmer, from Experience, that this Kind of Spurrey is equal to the other ſo commonly ſown in Flanders, and at one Time not uncommon in England, in its Qualities: let it not ſeem the Fondneſs for a Piece of Novelty, that influences me, when I ſay it is better; for it is as wholeſome and more juicy; and conſequently every Plant of it contains more Nouriſhment than one of the other.

This Sea Spurrey, which we propoſe to the Huſbandman who ſhall be ſituated near ſuch Land, to cultivate, is not unlike the former in its Manner of Growth, or the Shape of its Leaves or Flowers; but it is ſhorter, more upright, and has a fuller Stalk. The Farmer will ſee it frequent on theſe Sort of Grounds, and will know it without farther Deſcription.

It is ſo plentiful that the Seed, though it is not to be bought, may eaſily be gathered in Abundance; a Couple of Labourers in the Month of July, being employed one Day for that Purpoſe, would be able to bring in a vaſt deal of the wild Plant; it is at that Seaſon very full of the Seeds, and they will freely come out on threſhing; theſe may be ſown

with the leaſt Expence imaginable, and they will that Year produce a large Crop, and that at a Time when it will be very uſeful.

When the Seeds are got out of the dried Plant, they muſt be ſpread upon a Floor to harden; and after a Week they will be fit to ſow. That ſhort Compaſs of Time will be enough for plowing up a Piece of waſte Ground, which will need no farther Culture than this. Let it be well turned up by a Plow that will cut deep, and then harrowed over. After this let the Seed be ſown by the broad Caſt-way, in the Quantity before-mentioned, and then let a Roller be drawn over the Ground, to preſs it in.

The Land in ſuch a Place is of little Price, all this Trouble and Charge will amount to, in a Manner, nothing, and there will undoubtedly be a Crop. Its Uſes being the ſame with thoſe of the common Spurrey, the Farmer has been told them already; and if it do but equal that there will be Advantage in the Attempt; but he may be aſſured it will very conſiderably exceed it. This is one of thoſe Trials we have to propoſe to the induſtrious and ſpirited Farmer, and like all the reſt, it may be attended with conſiderable Good, but can do him very little Harm.

End of the Seventh Book.

A COMPLEAT BODY OF HUSBANDRY.

BOOK VIII.

Of ſuch Roots as may be advantageouſly planted in Fields.

In ELEVEN CHAPTERS.

The INTRODUCTION.

WE have had Occaſion to obſerve in ſeveral Places, in the preceding Part of our Work, that the Gardener and Farmer are intrenching upon one another's Province; the Gardener planting his proper Crops in the Field, and the Huſbandman employing himſelf about the Products generally ſuppoſed to belong to the Garden. This is no where ſo much the Caſe with the latter, as in the preſent Inſtance.

We are in this Book to treat of Roots which the Farmer may advantageouſly cultivate in Fields, but which have been originally, and are in general ſtill at this Time, the Products of the Garden. Theſe he will find it eaſier to manage than many of his more uſual Crops; and we would in this Work let him into the Knowledge of every thing that can be profitable to him. A Field is a great Garden, if he pleaſes to make it ſo; and the main Difference lies in the Degree of Culture. For many of the common Products of the Garden the well managed Labours of the Field will anſwer; and if he add to theſe more Expence, and a different Manner of working, he will find it perfectly anſwered by the Encreaſe and Value of the Production.

There are many Roots that may be cultivated in Fields, and that are ſo at preſent in one Part or other of the World: with all theſe we ſhall bring him acquainted, and with their Manner of Culture; but there are three principal Species at this Time propagated, in the Fields of many Parts of our own Country with great Benefit, and which we wiſh could be thrown into the Farmer's Hand univerſally: theſe are the Turnep, Potatoe, and Carrot. The Demand for theſe is continual and great, ſo that there is no Danger of over-ſtocking the Market; and as they bring the Farmer in ſome Places a very great Profit, we ſhall endeavour to enlarge that Branch of the Profeſſion.

After theſe are to be named the other Roots, we have mentioned ſome of them propagated at preſent only abroad, and others confined to one or two Spots of the Kingdom; theſe we ſhall ſeparate from the preſent, treating of them

in a ſucceeding Book, together with thoſe other Products, whether Leaves or Flowers, which are in the ſame Manner in every Huſbandman's Power to cultivate to Advantage, though they are not yet well introduced among us.

Of the three Roots we have to treat of in our preſent Eighth Book, the Reader is to remember, that we have ſpoken of the firſt already, ſo far as the Drill and Horſehoeing Huſbandry are concerned in its Culture; to avoid Repetition therefore, we refer to that Head for many Particulars relating to the Turneps as raiſed by that Method for the Service of the Stock, and ſhall here treat of it only as propagated in the Field by the common Huſbandry, by which it may always be raiſed to equal, and commonly to excel in Sweetneſs, that of the Garden.

CHAP. I.

Of the Soil for Turneps in the common Huſbandry, and Manner of ſowing them.

A Poorer Soil will do for Turneps in the Horſehoeing Huſbandry, but in the common Way of Management we ſhall adviſe the Farmer to look upon them as a Garden Root, and to give them what is as near a Garden Soil as his Field will afford. In that Practice freſh Supplies of Nouriſhment may be given them, by dreſſing the Ground by Tillage while they are on it; but in the common Way nothing eſſential can be done to that Purpoſe, the Turneps are to truſt to ſuch Nouriſhment as is in the Ground when their Seed is committed to it; therefore the richer it is the better.

A good black mellow Earth, with ſome ſmall Admixture of Sand, or a very rich Loam with a great Quantity of mellow Earth among it, are the moſt favourable Soils for the Turnep in the Field. We would have our Farmer raiſe his Turneps to equal thoſe of the Garden, and there is no other Way but by a firſt good Choice of the Soil. Whatever be the Condition of Land on which they are ſowed in other Reſpects, two Qualities it muſt have, that it be light and warm, theſe will prevent the Deſtruction of the Crop; but we muſt add the other Quality of Richneſs, in order to their being well nouriſhed.

Turneps ſtand a great deal cloſer this Way, than in the Drill and Horſehoing Method, and therefore there muſt be more Richneſs in the Land that is to ſupply them. A Soil too ſandy is never very rich, this is the material Objection to that Kind of Land, which otherwiſe, from its Lightneſs and its Warmth, would be proper; as to Clays, they being heavy and cold, are, of all Soils the worſt for Turneps: the other Kind, as they approach more or leſs to the one or to the other of theſe, are the fitter or more unfit for the Growth.

The Quantity of Seed for the ſeveral different Methods of Huſbandry we have mentioned before, and ſhall add here, that there is a Nicety in covering the Seed which few regard, and Errors in which are the Cauſe of half the Miſcarriages that happen to Turnep Crops. This Seed requires to be tolerably well covered, and in particular to have the Earth preſſed cloſe about it. From the Want of this ſingle Circumſtance, I have ſeen Crops that had every other favourable Accident that could be named to attend their Growth, come up poorly, and half of them decay afterwards, while the Remainder came to little or nothing.

On the contrary, there is no Danger of ſqueezing and preſſing the Earth too firmly about them; for we have ſeen very fine Crops of this Root raiſed, by ſowing Turnep Seed in a Barley Field juſt before mowing. In this Caſe it is eaſy to conceive how the Ground muſt be every where ſqueezed, by the treading and carrying off the Corn; but this, far from hurting the Seed, has ſent it properly into the Ground, and the Stalks of the Barley ſheltering it, have done inſtead of a better Covering.

As we ſee by this what Degree of preſſing Turnep Seed will bear, when in the Ground, we ſhould give it accordingly, but in a more regular Manner. The common Harrow tears up the Ground too much, and buries the Seed too deep; the beſt Way therefore is, when it is ſcattered properly upon the Field, to draw a Buſh Harrow over the Ground, by Way of covering it lightly, and then to go over it with a very heavy Roller. There is alſo another Method that may be uſed for ſowing of Turnips, which is, to have a wooden Roller ſtuck full of ſhort Pegs, then drawing it over the Ground the Seed is to be ſcattered in, and a Buſh Harrow is to be drawn over it afterwards, which will ſufficiently level the Ground.

This Article of preſſing down the Earth about the Seeds, though very eſſential to the good Growth of this Plant, is not particular to it, but is of excellent Uſe in many others; we ſee ſomething like it practiſed on many Seeds in Gardening, which they tread in firſt, and then lightly rake the Earth over afterwards. A good Roller would anſwer the Purpoſe of this treading, when the Seed had been in the ſame Manner ſcattered over the Grounds, and it would be eaſy to have the Harrows with ſhort ſharp Tines, that ſhould anſwer the Purpoſe of their Rakes. This would be a Means of bringing the Garden Method of working, in many Inſtances, into the Field, and in none it can be more proper, than when Things which are common Garden Products are concerned.

The great Danger of the Fly may be, in ſome Meaſure, obviated by a proper Steeping of the Seed before ſowing. There is an excellent Receipt among the Farmers for this Purpoſe, the Succeſs of which has evidently been ſo great, that it were idle to think of propoſing any Alteration in the Ingredients. What we have ſeen in the Difference of Crops that have been ſown with this Advantage, and others in the ſame Circumſtances, the Seeds of which were ſown without ſteeping, makes us very deſirous that it ſhould be univerſally known, and univerſally followed. The Receipt is this. Mix together equal Quantities of Stone, Lime, and Wood Soot. Have ready a Quantity of Urine, ſufficient to moiſten them into a thin Pap. Heat a little of the Urine and put to the reſt, that it may be all Milk-warm, then mix it by Degrees with the Lime

Lime and Soot. The Lime will preſently ſlake, and breaking to Pieces, the whole will make a ſmooth Maſs of a thin Conſiſtence, pour this when cold upon the Turnip Seed, let it remain in it four and twenty Hours, and then ſow it in the Manner we have directed.

CHAP. II.

Of managing Turneps in the Ground.

THE firſt Care is to watch the growing Shoots while very young, to ſee whether they be taken by the Fly. It is impoſſible to guard perfectly againſt this Accident, but it is very proper to be upon the Watch, to know it as ſoon as poſſible, for it ſhould be repaired by an immediate other Crop.

We have obſerved before, that this Danger is only while the Turnep is in its Seed Leaf, becauſe theſe Inſects do not regard it afterwards. The Taſte of theſe Ingredients will, in ſome Degree, hang about the Seed Leaves, ſo that they will be more likely to eſcape when it has been ſteeped, than when ſown without that Precaution; but I have ſeen it ſometimes eaten down by them after this Method; and therefore warn the Farmer not to truſt to it entirely, though it give him great and reaſonable Hopes.

When the Crop has got over this Danger, the next is its being ſtarved by Weeds. Several Kinds of theſe will grow among Turnips as among other Crops; but there is one particularly miſchievous, this is Charlock, it reſembles the Turnep ſo much in the Leaf, and Manner of growing, that it may riſe among it in great Quantities unnoticed; nor is it always ſafe to order it to be weeded out, for there have been Inſtances of the Weeders taking up a whole Crop of Turneps, and leaving all the Charlock, this being a Time when the Turnep has not got any thing of a Root, whereby it ſhould be diſtinguiſhed. The proper Weeders at this Seaſon are Sheep, they will diſtinguiſh where the Labourer cannot, and what is very ſingular and very happy for the Farmer, they will, in this Period of the Growth, prefer the Weed to the Crop.

He is therefore firſt to inform himſelf thoroughly of the Difference between Charlock and Turneps, which conſiſts in the Size, Colour, and Diviſions of the Leaf; and though there be a general Reſemblance to an unpractiſed Eye, this is a very ſufficient Diſtinction to thoſe who will look narrowly. If he find his Turnep Field over-run with this deſtructive Weed, let him turn in a competent Number of Sheep; and they will eat off all the Charlock, which will never riſe to any Height again, and they will leave the Turneps untouched. This might ſeem a very deſperate Undertaking to ſuch as had not ſeen it practiſed, but there is no arguing againſt Experience, and this is a Method that has ſtood the Teſt of Ages. The only Caution is, that too many Sheep be not turned in: a very moderate Number will be ſufficient for the Purpoſe, and more might damage the Crop which they did not devour.

The Charlock being removed, the Diſtance of the Plants is to be conſidered; and as they generally riſe a great deal too thick from this random Way of ſowing, they are to be reduced in Numbers, and brought to this proper Diſtance by the Hand Hoe. This at the ſame Time clears off the Weeds, of whatever Kind, that have riſen among the Turneps; and they are left by it at a proper Diſtance, and with a clear Ground freſh broken for their Nouriſhment. The due Diſtance for the Crop we have ſhewn already, and ſhall not repeat any thing before delivered here. This hoeing is all the Farmer can, in the common Method of Huſbandry, do for his Crop; therefore when this is done he is to wait their Growth, as Nature brings them to their Perfection. As they arrive at that there is a Method of uſing them which will be of great Service, and which is ſo plain and obvious to Reaſon, that it ſeems aſtoniſhing it is not univerſally practiſed.

The firſt Uſe of the Turneps is to feed Cattle under Cover, and for this Purpoſe a proper Quantity are daily to be pulled up, and carried Home in Carts. I have frequently ſeen the Farmer's People at work upon this Plan, beginning at one Corner of the Field, and clearing all off carefully as they went on, that by Degrees a good Part of the Field has been left bare, while the Crop was growing on the other. Nothing can be more contrary to good Senſe than this Practice. The Farmer has here an Opportunity of bringing his Field into better Condition every Day, and for want of a little Thought it is utterly neglected.

None can diſpute but that the Turneps raiſed by the Drill and Horſehoeing Huſbandry, are vaſtly larger than thoſe in the common Method: this is in a great Meaſure owing to their Diſtance. The greateſt Advocates for that Practice urge, as a Reaſon, that the Turneps in the common Way of Culture, are ſtarved by ſtanding too cloſe; and here is an Opportunity of thinning them. When ſome of them are to be pulled for feeding in the Houſe, the Trouble will be little more to gather them in different Parts of the Field; and the Benefit will be very great.

Let the Perſons ſent to pull the Turneps, have Orders to draw them in ſuch Manner as to thin the reſt of the Crop regularly. The very pulling of them up will break the Ground a little, and every thing of this Kind is an Advantage: the Turneps left in the Field will be thus at greater Diſtances, wherefore they will grow to a larger Size; ſo that it is very natural to expect, and it will be anſwered in Fact, that they will make Amends by their Encreaſe in Bulk, for all that are taken up; and the Crop ſhall be in reality not diminiſhed in Quantity, but only in Number.

CHAP. III.

Of the Uſes of the Turnep.

THE Uſe of the Turnep at our Tables is ſufficiently known, and it were idle to enlarge upon it here. All that the Farmer is concerned to know about it is, that it will always

make a Demand for them, and that this Demand will be proportioned to his Situation, near or remote from a Market; and according to the Bigneſs of that Market when he is near one. Of this he is certain that he may, on theſe Occaſions, ſend a Servant with a larger or ſmaller Parcel of his beſt Turneps to Market, according to the Demand, and they will make a very pretty Addition to his Profits.

If he live in the Neighbourhood of a great Town, it will be worth his while to keep his Crop wholly for that Purpoſe, or to make only ſuch a Reſerve of the worſt Part, as may be juſt needful for his Cattle; and he will thus be a Gardener, only in a larger Way: for his Field, managed as we have directed, will ſupply him with Turneps in every Reſpect equal to thoſe from the beſt Gardens. Not to purſue this Conſideration farther, we are now to enquire into the beſt Manner of giving Turneps to Cattle, and the various Kinds that will eat them; the Seaſons at which they are moſt proper, and their ſeveral Services.

It was thought at one Time a great Piece of Huſbandry, to chop Turneps to Pieces before they were given to Cattle; but this has been found to have had, inſtead of good, bad Conſequences, and is now utterly omitted. This tempted the Creatures to eat them without chewing, by which Means they had not half their Nouriſhment, and ſome times they were choaked with the Hurry of ſwallowing them: chewing is a natural Part of the Operations promoting Digeſtion. We have many People liable to great Diſorders in their Stomach, only from a careleſs and haſty Manner of eating; and the ſame Diſorders will ariſe to Cattle from the ſame Cauſes, eſpecially to thoſe which eat a Food ſo uncommon in their natural State as Turnips. The proper Method, on all Occaſions, is to give them whole, and it is in general much more profitable to pull them in proper Quantities, than to turn the Cattle into the Field. They eat up more entirely what are given them, ſo that there is no Waſte from their leaving, or from their trampling; and they fatten much ſooner when thus kept up, than when they ramble about.

The only Inconvenience attending fattening of Cattle with Turneps is, that it will give a Flavour to their Fleſh: but this is eaſily remedied, by feeding them at leaſt ten Days or a Fortnight with Hay; in which Time the Effect of the former Food, as to Flavour, will be entirely gone off.

Some Creatures have been ſuppoſed to be incapable of fattening with Turnips, becauſe they do not readily take to them; but theſe muſt be humoured into it. We have obſerved already, that the Turnip is not one of the common or moſt natural Foods of many of thoſe Animals, to whom it is very wholeſome. When any Creature the Farmer has a Mind to feed with the Turnip, does not take kindly to it at firſt, the Way is to boil it. And thus it will often go down, after which, the Taſte being known, it will be very well reliſhed raw.

If the Farmer be in Fear of the Fly for his Crop of Turnips, he may uſe ſome Precaution beſide what we have directed, in the ſteeping of the Seed: Wood Aſhes are found very deſtructive of this little Inſect; it is therefore a good Method to ſcatter a Parcel of theſe thinly over the Crop, juſt after the Plants are above Ground: it will often preſerve them; and is ſo far from doing Harm that it will always promote the Growth.

After this Fly, the greateſt Enemy to the Crop of Turnips, is the Caterpillar. It is a particular Kind that ſeizes upon the Turnep Leaf, and this only devours it while young. It is a ſmall black Kind, that will be found very plainly when it is in ſufficient Number to do Miſchief, for it can do this no otherwiſe than by the Multitude, like the Fly. When theſe are ſeen the Weather is to be conſulted, for in a dry Seaſon they may be deſtroyed at once by proper rolling, but in wet Weather that Inſtrument muſt not be brought upon the Ground. Therefore, if the Condition of the Land, and of the Air, permit, let a Roller be drawn carefully over the whole Ground, very early in a Morning. The Caterpillars will at that Time be out on their Food, and their Bodies being tender, the Roller preſſing heavily, and the dry Earth making ſome Reſiſtance, they will be utterly deſtroyed. This Preſſure of the Roller, far from injuring the Turneps, will make them root the better.

The naked Snail, or as it is commonly called, the Slug, is alſo very troubleſome on theſe Occaſions. If it be at a proper Time of the Growth, the Roller uſed in the ſame Manner, will deſtroy that alſo; but if the Turneps are at ſuch a Growth that the Roller cannot be taken on, then the Method is to turn in ſome Ducks, they are fond of theſe Creatures; they will do no Harm to the Turneps; and their Dung will help the Ground.

Theſe are the general Methods of raiſing the Turnep, and of preſerving it in its Growth.

But beſide theſe are ſome other Methods, approved by Experience, and worth the Farmer's Notice.

CHAP. IV.

Of particular Ways of raiſing a Crop of Turneps.

FIRST, there may be a very good Crop of Turneps got by ſowing them upon the Stubble, as ſoon as the Corn is off. The Seed, in this Caſe, is only to be harrowed in, and the Crop reſerved till late in the Spring, for the Food of Ewes and Lambs. If the Land be intended for Fallow, in the open Field Countries, they may very well ſtand on it till April, which will make a Supply for Sheep at that Time of the Year, when Proviſions are moſt ſcarce of all. A great deal of the Succeſs of this Crop depends upon the Seaſon, for if the Winter be very ſevere it often comes to nothing; if mild it ſeldom fails, and in the other Caſe the Loſs is trifling.

Another Method which has been practiſed with great Succeſs, is to ſow the Turnep Seed pretty thick among a Crop of Hog Peaſe, juſt when they are ready to cut. No more Care need be taken in this Caſe, beſide the ſcattering the Seed

Seed in proper Quantity over the Ground, among the Pea Stalks, but this Quantity muſt be as we have ſaid, larger than is commonly allowed, becauſe ſome will certainly be loſt. The Reapers are then to be ſent in with their Hooks, and no particular Orders need be given them concerning the new Crop. Let them cut and carry off the Peaſe in the uſual Way, and the natural and neceſſary treading of the People's Feet will cruſh the Seed of the Turneps into the Ground, and preſs it down a little, which is every Way aſſiſtant to the Growth of this Species.

In this Manner, when the Peaſe are off, and the Ground has been a little at Reſt, the Turneps will ſhoot up, and they will be in leſs Danger of Inſects at this Decline of the Year, than they would have been in the wet and warm Part of Spring; if they appear the ſame Methods may be uſed to deſtroy them, and, one Way or other, the Farmer has a fair Chance for a good Winter Crop.

When they are at ſome little Height they will require to be hoed by Hand, for two Reaſons, the one is to thin them, the other to break the Ground about them. The Weeds are deſtroyed in Conſequence, but this is a leſſer Conſideration, for at this Seaſon they are fewer than in Spring.

The Neceſſity of thinning the Crop is greater in this Way of raiſing them than in any other, becauſe they will riſe more irregularly; and when they are very thick in ſome Parts, and other Spots are entirely vacant, as will be the Caſe, they ſhould be taken up and tranſplanted. The Earth being trod very much, and not broken up, requires this hoeing alſo, for otherwiſe it will be too hard. It anſwers the Purpoſe of the Seeds, becauſe the Peaſe have made it mellow.

Another very uſeful Way of raiſing a Winter Crop of Turneps, is upon a Piece of Ground where there have been Beans: but in this Caſe the Method is to plow up the Land once, and then harrow in the Turnep Seed. Either after Beans, or a Crop of any Kind of Corn where it has grown thick, the Ground is ſo hollow, that once plowing does very well to prepare it for Turneps; and by any of theſe Methods, if the Winter prove tolerably mild, there is no Doubt of a profitable Crop, but otherwiſe theſe late ſown Turneps frequently ſuffer.

CHAP. V.

Of the Potatoe.

THE Potatoe is an extreamly uſeful Root, and one that may very properly be cultivated in Fields. It is indeed fitter for the great Extent and plain Faſhion of a Field, than for the narrow Compaſs and divided Beds of a Garden, when we conſider its prodigious ſpreading. 'Tis but lately we have informed ourſelves properly of its Culture; and the more we know of that, the more Reaſon we ſee to baniſh it the Garden, and introduce it into the Field. It is hardy enough to bear the Expoſure, and it requires no great Charge in the Culture and Management; why then ſhould we limit it to the Garden, every Particular ſpeaks for its being given into the Hands of the Farmer, eſpecially when near large Towns, though every where there will be a great Demand. We ſhall therefore lay him down ſuch a Method for their Management, that he cannot fail, by obſerving it ſtrictly, to meet with a Succeſs that will make him keep up the Culture of this Root at all Times.

The Potatoe is a Plant of a ſingular Form and Manner of Growth: the Botanical Writers refer it to the Nightſhade Kind, calling it Nightſhade with the tuberous eatable Root. It is ſingular, that one of the moſt innocent Plants in the World, ſhould belong to a Claſs naturally and generally poiſonous, but theſe are Matters wherewith the Farmer has no Concern.

The Root of the Potatoe is compoſed of ſeveral large roundiſh Lumps, joined to one another by Means of Strings, and ſpreading a great Way in every Direction. The Stalks are numerous, three Foot high, branched, and full of Leaves; theſe are divided into ſeveral Parts, or each is compoſed of ſeveral Pairs of ſmaller, with an odd one at the End, but the Diviſion or Diſpoſition is irregular. The Flowers are large, and either of a duſky purpliſh Hue, or white, this being a trifling Variety, from which, as alſo the Colour of the Outſide Skin of the Roots, the Potatoe is divided into two Kinds, under the Name of the red and white: the Fruit is a large Berry.

We had this Plant originally from North America, and at this Time raiſe it in vaſt Plenty, and to a very great Profit. It is in a Manner the Food of the common People of Ireland; and is cultivated in Lancashire, and ſome other Parts of England, in vaſt Quantities. Our Intent is to make it more univerſal.

CHAP. VI.

Of the Soil for Potatoes, and the Manner of planting them.

MORE depends upon the chuſing a proper Soil for Potatoes, than for almoſt any other Root. Not but it is hardy, and will live any where, but it will not ſpread and propagate its Roots, unleſs the Soil ſuits. It is the Farmer's Intereſt to conſider this Particular in the moſt careful Manner.

There are but few Soils that will anſwer, in the right Manner, to the Potatoe; and thoſe that do, yield ſuch a prodigious Encreaſe, that on both Occaſions it is worth conſidering ſtrictly. The firſt Quality the Soil for Potatoe muſt have is Freedom and Openneſs, the ſecond is Richneſs, and the third a due Degree of Moiſture. This ſhews us that the beſt Soil of all for them is a mellow Earth, or good fine Mould, in the Condition wherein we moſt frequently ſee it, which is light, deep, and with ſome Moiſture; this points out a Part of the Kingdom for the Propagation of Potatoes, where they are very little regarded at preſent, the Northern Edge of Northamptonshire, and the adjacent Country. They have there this Soil in great Perfection, it is in ſome Places too wet, but there it would not

anſwer, the Place is where the Moiſture is moderate.

After the mellow and pure Earth, the Soil moſt favourable next is a rich Loam: this will ſupply them very well alone, if it be of the richeſt Kind of this Earth, but if not it is to be mended by Dung.

By this Direction as to the Soil the Farmer is to chuſe, he will know what he is to avoid; and firſt of all Clay is to be ſhunned, becauſe it will not ſuffer the Roots to ſpread; and Gravel, becauſe it will not ſupply them with Nouriſhment. Chalky Soils are alſo improper for the ſame Reaſons as Gravel, becauſe there wants Nouriſhment; as to the ſandy Kind they fall under the ſame Fault of Poorneſs, but they are open and free for the ſpreading of the Roots; and on ſome Grounds of this Kind, that have not been too abſolute a Sand, improved a little with Manure, I have ſeen very good Potatoes.

The red Potatoe ſucceeds beſt upon the ſandy Soil: but it never equals that on the rich Loam, leſs ſtill that on the mellow Earth. The different Effects of the Soils we have named are theſe, the Clay will not let the Roots ſpread; and the ſandy, though they give the ſpreading Room, will not feed them ſufficiently; the light mellow Earth produces therefore the largeſt and the moſt numerous Roots.

There may be an eaſier Improvement made in the ſandy Soil, than on any other for this Uſe. The laying on, from time to time, a proper Manure, will bring it into a good Condition, as one naturally fine. The beſt Manure is rotten Dung and the Mud of Ponds, this, mixed in a good Proportion, and laid on freely, will bring a Piece of ſandy Ground, that has any natural Richneſs of its own, into the Condition of the fineſt loamy Soil whatſoever; and there is but one, as we have ſhewn, ſuperior to that for the raiſing this Root well.

The Soil being choſen the Potatoe is to be planted, and in the doing that there is no great Difficulty; however, the Farmer muſt exactly obſerve the Directions, or he will fail in his Crop.

This being a Kind of Garden Root, let the Garden Practice be ſo far obſerved, that the Ground be well broken and prepared for the Reception. Let it be plowed in a careful Manner, conſiderably deep, and ſo as to break the whole Soil.

Let there be Trenches or Furrows cut acroſs the Field, ſix Inches deep, and a Foot aſunder; in theſe the Farmer is to lay regularly and carefully, the ſmalleſt Roots of Potatoes he can get, but with a very particular Care that they be freſh and fine. They muſt be placed in theſe Trenches ſix Inches from one another, and covered up by harrowing the Ground all over.

This is to be done in the latter End of February, and the Land is to be left in this even Condition till the Potatoes ſhoot, and the Weeds among them.

When theſe are up at ſuch a Height that they can be well diſtinguiſhed from the Shoots of the Potatoe, the Hoers are to be ſent into the Field, to cut them all down; and in doing this they will break and divide the Surface of the Ground ſo, that the Rains and Dews will get in, and the Crop thrive upon it immediately.

When the Weeds have once again got up to a Height, as they ſoon will from the Wet and Warmth of Spring, the Hoers are to go in again and clear all away.

After this no more Care is requiſite, the Stalks of the Potatoe will now be ſo high and ſo ſtrong, that they will ſuffer no more Weeds to grow among them.

This is all the Culture and all the Care the Potatoe requires; and nothing can be more eaſy. Here is no particular Expence in preparing the Ground, no great Charge of Stock or Labour; and there is no Hazard of Succeſs. The Sale is certain, and the Profit abſolutely very great. One Summer brings the Crop to Perfection, and there is no one Shadow of a Reaſon againſt the Farmer's raiſing them.

CHAP. VII.

Of preſerving Potatoes.

OUR Crop has been put into the Ground in the End of February, and it requires no more Time for its Encreaſe than to the latter End of September. Indeed no more than this can be allowed it, for the Potatoe ſhould always be taken out of the Earth, before there be a Poſſibility of Froſts that could hurt it. During the Summer it is free from any Danger, and in Autumn it is to be taken out of the Ground.

Toward the Middle of September let the Farmer begin to take up his Potatoes, and let him begin with that Part of the Field that lies moſt expoſed, leaving till afterwards that Part which is moſt ſheltered: he is thus to begin and to continue taking them up, Parcel after Parcel, once in two or three Days, as there is a Demand for them: but when he perceives the Ground firſt affected to any Depth by the Froſt, he muſt at once get up all the Remainder, for this is an Accident that will always hurt them.

As he will perceive the Seaſon of the Froſt approaching, he muſt prepare for it by providing a Place where to put his Potatoes, when he ſhall take them up. A Cellar, with a good Quantity of Sand, will anſwer this Purpoſe, and he will thus be able to preſerve them from Froſt: taking out what he has a Demand for, as he wants them, and reſerving the ſmalleſt, which will bring him leaſt at Market, for planting in the Spring.

This is the whole Care requiſite. As to the Produce it will be greater than thoſe can eaſily believe, who are not much accuſtomed to ſuch Things; it will depend upon the Soil, as we have obſerved already, but the Difference is ſo great, that the Expence of well dividing and breaking the Land by Tillage, and well enriching it by Manure where requiſite, will be very amply returned. The Size as well as Number depending on theſe Articles.

Ten tolerably large Potatoes is but a moderate Produce, from each ſmall Root that was planted in Spring; when the Ground is more favourable, thirteen or fourteen handſome ones; and on

counting, with the beſt poſſible Exactneſs, in a Field of Mr. RYDER's near THORPE, where every needful Caution had been taken, we computed this Year, 1746. that there were in general eighteen large and fine Potatoes for every ſmall Root planted. This, for a ſeven Month's Encreaſe, is very great; but Nature has in all Things provided, that whatever is moſt uſeful is moſt abundant.

The Conſequence of the Froſt taking the Potatoe, is a Kind of Diſſolution of its Subſtance, it runs to Water and rots.

The Approach of Froſts is a plain Direction, but the Decay of the Stalks, and the Condition of the Plant, will not fail to give the Farmer an earlier Notice. About the Middle of SEPTEMBER the Plant entirely ripens, and after that it quickly fades. The firſt Froſts which we do not feel, affect Plants, and in this Caſe they attack the Stalk and Leaves, before they penetrate the Ground ſo as to come near the Root. When the Farmer ſees the Leaves yellow, and the Berries of a dead ripe Colour and dropping, he may take Notice that the firſt Appearance of Ripeneſs in the Root is come. Let him begin to take up at that Time, and continue till all are out of the Ground.

It has been propoſed, by ſome who are fond of Schemes, and preſume to call any Practice that is new, an Improvement of Huſbandry, to cut off the Tops of the Potatoe as ſoon as they grow poor and fade, in order to preſerve the Root from Froſts. I have ſeen this tried, and it is fit I warn the Farmer from repeating ſuch a Project. It let in the Froſt to the Roots where I ſaw it experienced, much ſooner and more powerfully than it otherwiſe would have been, and the Conſequence was the Loſs of great Part of a very good Crop of Roots.

The Tops in this Inſtance were mowed down very clean with a Scythe, and there could be no better Way propoſed, but the Effect was juſt contrary to the Improver's Expectation, though very conformable to what might have been expected from Reaſon, for certainly Nature here is the beſt Adviſer.

The Potatoe very difficultly preſerves itſelf againſt the firſt Froſts of the Winter, but it will be ſheltered by the Quantity of dead Stalks and Leaves of its own, that lie upon the Ground; which will ſerve as the laying of Straw and Peaſe Haulm about early Plants, a Practice very well known for its Effects by all Gardeners: then, on the other hand, the cutting off the Stalks not only denies the Roots the Protection and Defence of their Covering intended by Nature, but lets in the Froſt directly to them, through the cut Part of the Stalks. This is an Effect ſo agreeable to Reaſon, that one would wonder the other Thought could ever have entered into the Head of any Perſon in the World.

The Advantage of the Potatoe lying as long in the Ground as may be, is that it all the Time is encreaſing in Bigneſs, at leaſt till Froſts come, and the Encreaſe in Bigneſs is Encreaſe in Value.

Some have ventured their Potatoes in the Ground all Winter, covering them with Fern and other ſuch Matters, beſide their own Straw; but this is hazardous, and of no Uſe. The Potatoes may thus be preſerved through the Winter, but they will not grow in the leaſt, and there is ſome Danger that they may periſh in ſpite of all the Covering. The Nature of the Field muſt finally determine the Farmer who is enclined to this Expedient, whether he ſhall venture upon it or no, for there may be Differences in Soil and Expoſure, very eſſential on this Head. The more Wet there is in the Grounds the greater the Danger; the ſandy Soils therefore are fitteſt for this Purpoſe. A Field may be ſo ſituated, and of ſuch a Soil, that the Ground may ſerve as Sand, and the Encloſure keep it as warm as a Cellar; but in this Caſe there is no Advantage, though there may be little Hazard; ſome Sand in a Cellar keeps them more ſecurely, and they will no more grow in the Field than there.

When the Time of taking the Potatoes up is come, the Farmer muſt ſend into the Ground a Man or more, and to every Man one or two Women, or grown up Children; the Man muſt have a ſtrong three tined Pitch Fork, with which he is to dig up the Potatoes, and the Women and Children are to follow him, picking them up, and carrying to Heaps that they may be conveniently taken off the Ground together.

When they are got Home they muſt be cleaned, and lightly waſhed, and after this dried two or three Days in the Sun, they will then be fit for Market or for keeping.

Beſide the Way of keeping in a Cellar, Potatoes when the Quantity is very large, may be preſerved during the Winter, in a Pit made in the Ground, but this muſt be done with great Care and Circumſpection. The Farmer who intends this Method, muſt ſee for a dry Place, where the Soil is of a warm Nature, and there is good Shelter. Here he muſt dig his Pit or Ditch, and the beſt Method is to make it in Form of a Ditch, three Foot wide, five Foot deep, and line it on the Sides and Bottom with dry Wheat Straw. This done the Potatoes are to be carefully put in till the Ditch, which is to be long in proportion to the Quantity, be full up to the Level of the Ground; a Quantity of Straw is then to be put over them, and on this is to be raiſed a Ridge of very dry Earth. In this Manner they will keep throughout the Winter, and be ready on all Occaſions.

Where the Ground is a perfectly dry Sand or Gravel underneath, the Potatoes may be kept very well in Pits, dug for that Purpoſe; and thus they are preſerved with Sand for the Supply of the LONDON Markets, in thoſe Parts of ESSEX and other Counties where they raiſe moſt for that Purpoſe.

For the Sake of the Farmer who ſhall deſign to have large Concerns in this Article, I ſhall give ſome ſhort Hints reſpecting a particular Kind of the Potatoe, which though leſs obſerved by the Planters than it deſerves, has Advantages quite ſeparate from the others.

We diſtinguiſh the Potatoes into two Kinds, the white and the red; but we may very well add a third, which is this of which I ſpeak, under the Name of the yellow.

Whoever is accuſtomed to deal largely in this Root, muſt have obſerved that there is a yellow Kind,

Kind, which is uſually very large and thin ſkinned. This though leſs known among us, or leſs regarded, is kept ſeparate by the Irish, who are more uſed to this Root, and prefer it to both. Its Size is not the only Difference, or the only Advantage.

We have ſeen that the great Danger in Potatoes, is the loſing them by Froſts: the Reaſon of this is their ſhallow rooting, though we plant the firſt Roots at ſix Inches deep, thoſe which ſpread from them will riſe to the Surface, and it is this expoſes them ſo greatly to the Froſts. It is particular to the yellow Potatoe, that it roots deep: the ſeveral new Roots are generally deeper in the Ground, than the firſt was planted. This is a vaſt Advantage, for they will be ſafe when the others are deſtroyed. Every one knows the general Uſe of Potatoes among the Irish: they never take them out of the Ground in Winter, but as they want them, in many Places, but it is becauſe they propagate this yellow Kind; for the others wloud be deſtroyed often there, as well as here, becauſe of their ſhallow rooting.

This Kind is in Ireland called the Munster Potatoe.

This Kind will laſt in the Ground a great many Years, becauſe of its deep rooting; but though the Practice in Ireland, and in Lancashire in ſome Degree, authorizes this Method, I ſhall adviſe the Farmer utterly againſt it: I have always ſeen this Root, like other Things, flouriſh beſt in a new Plantation, for which Reaſon I ſhall adviſe the Farmer always to clear, and new till the Ground once in three Years, that he may have its full Advantage. I ſhall alſo adviſe him againſt the common Practice in ſome Places of planting Pieces of Potatoes, inſtead of whole Roots; it is true that Pieces with any Eye to them will grow, but whole Roots always ſucceed much better.

CHAP. VIII.

Of Carrots.

THE Carrot is the only Root we ſhall mention farther in this Place, reſerving ſuch as are leſs commonly known, to the ſucceeding Book. This is a Root as fit for the Field as the Garden; requiring very little Culture, and producing a very great Profit to the Planter. It is hardy enough to ſtand all the Attacks of Cold, and other natural Accidents. And though in ſome Parts of the Kingdom, only hitherto kept in Fields, is very worthy to be introduced in the Huſbandman's Catalogue every where, and is indeed, for many Reaſons, fitter for the Field than the Garden.

The Root of the Carrot is long and thick, varying in Colour from the deepeſt Orange to the paleſt Straw, and having every Tinge of red or yellow. The Leaves are large, and divided very beautifully into a Multitude of minute Parts. The Stalk, when the Carrot gets to flowering, riſes in the Midſt of the Leaves, and is four Foot high. The Leaves ſtand irregularly on it, and are like thoſe at the Root, only ſmaller and paler. The Flowers are little and white, they ſtand in a large rounded hollow Tuft at the Tops of the Branches, and are followed by Seeds that are numerous, ſmall, pale coloured, light, and rough.

This is the general Deſcription of the Carrot, which from its Flowers growing in a Tuft, like an Umbrella, though leſs ſo than many others, is one of thoſe called by Authors Umbelliferous Plants.

We have obſerved that there is a Variety of Colour in the Roots of the Carrot, from the deepeſt Orange to the paleſt Straw, or Sulphur Colour: the Gardeners have hence, according to their Cuſtom, made what they call three principal Kinds of Carrot, taking the three moſt diſtinct Degrees of Colour, the deepeſt, the middle, and the paleſt. Theſe they call, 1. The dark red Carrot. 2. The Orange Carrot. And, 3. The white Carrot. The firſt and laſt of theſe Terms are ſomewhat improper, the firſt Kind being only a very deep Orange, and the other only a very pale Yellow.

The firſt is the moſt generally eſteemed: People who are critical in theſe Matters, uſually preferring the deepeſt coloured Carrots; the white Kind is more common in France and Italy than here; and though Cuſtom give the Preference, the contrary Way is the ſweeteſt and fineſt flavoured of them all.

This however is not to influence the Farmer in his Choice. He is to cultivate not that which is beſt, but what People think ſo; and therefore he is to chuſe the deep red, commonly called the Sandwich Carrot.

This, with the Management we ſhall direct in the enſuing Chapters, will never fail to return to the Huſbandman a very conſiderable Profit, at a very moderate Expence.

CHAP. IX.

Of the Soil for Carrots, and its Preparation.

THE firſt Thing a Farmer muſt do who intends to plant Carrots, muſt be to examine whether he have proper Ground, for without this there is no ſucceeding: thoſe Plants whoſe profitable Part is the Leaf or Ear, may be raiſed on very different Soils, by the Aſſiſtance of Manure; but theſe which depend on the Root can never come to any thing, when the Ground is not proper in its own Nature.

Three Things are requiſite in Land for Carrots. It muſt be deep, rich, and dry. Theſe do not ſo often concur as the Farmer might be inclined to wiſh. Deep and dry is common, becauſe all ſandy Soils have it; and therefore in general they are fit for Carrots; but to be rich withal is the compleating of the Buſineſs: the other will give Room to penetrate and Warmth to cheriſh, but when Nouriſhment in Abundance is joined with theſe, in the Richneſs of the Land, 'tis then the Ground is compleatly proper.

For this Reaſon a fine rich deep Garden Mould, where there is not too much Moiſture, is very proper for them; but too much Moiſture is the com-

common Fault of this Kind of Ground. Therefore to ſpeak from Experience, I ſhall declare the very beſt Soil for Carrots to be a rich Loam: that is, a dry Earth, in which there is a great deal of Sand, a good Quantity of mellow Earth, and a very little Portion of the Clay. Some of this there is in all Loams, but the leſs the better on this Occaſion; I have ſeen excellent Land for Carrots in Northamptonshire and Lincolnshire, upon thoſe riſing Grounds adjoining to the Fens, and juſt raiſed above them. And in Surry and Sussex there are vaſt Tracts of Ground left in a Manner deſart, which would yield a great Profit from Carrots. It is in theſe Inſtances we ſee the vaſt Advantages that would ariſe from making the Knowledge of Huſbandry univerſal; the putting into the Thoughts of Farmers in one Place, what is the profitable Practice of another on like Soils. We hope this Work will be inſtrumental to that excellent Purpoſe.

The Soil being choſen, the Preparation of it conſiſts in two Articles, the enriching it by Manure, and the breaking it deep by Tillage. All Land for this Purpoſe will anſwer the better, the more Care is taken of it in this Reſpect; and we ſhall ſhew the Manner of doing it; for otherwiſe all the Expence may be worſe for the Crop, than if the Land had been left in its natural Condition.

The Times of theſe Preparations are to be very different; as to the plowing and dividing of the Land, that ſhould be done juſt before the Seed is ſown; but the Manure muſt be laid on a Year before. This will occaſion no Loſs of Time with the judicious Farmer, for he may have a vaſt Crop of ſome ſlight rooting Plant, as the ſmall Pulſes mentioned in our laſt Chapter, or ſuch others which will mellow the Ground by ſhading it with their Stalks, at the ſame Time that they yield him a great Encreaſe, without exhauſting the Effect of his Manure. After this the Land being plowed up for Carrots, will be in the beſt poſſible Condition to ſupport them.

The Reaſon of this Management of the Dung is very plain: the Carrot will have great Advantage from the Richneſs it gives the Ground, for the richer that is the larger they will be; but then freſh Dung always ſubjects the Land to be full of Worms; and this is what ſhould be feared more than almoſt any other Accident, in a Carrot Plantation, for theſe Roots are a very luſcious Food for thoſe Inſects; and when Worm-eaten they are worth little.

For this Reaſon none but old and well rotted Dung ſhould be uſed; and that ſhould be laid on the Year before.

When the Grouud, naturally of a rich, light, and warm Nature, is thus improved by a well mixed and well rotted Manure, it is to be wrought for Carrots.

According to the old Huſbandry this could only be done by Hand, but this is an Article wherein we ſhall propoſe to the Farmer great Improvement. The Ground requires to be dug very deep for Carrots, becauſe their whole Value is their Length and Straitneſs, which they will never attain if they have not a free Paſſage down for their Roots. For this Reaſon the old Practice was to dig the Ground with Spades, and this was reaſonable, the Carrots requiring it to be well broken two Spit deep, and no Plow then in Uſe anſwering this Purpoſe.

This was in a Manner bringing Gardening into the Field; but that is not what we mean by recommending to the Huſbandman the Culture of Garden Roots. If they can only be propagated in Fields at the ſame Charge as in Gardens, there will be little Profit to him, and it is only leading him out of his Way; we ſhould not have named the Carrot as one of the Roots he may cultivate to Advantage, had we not intended to put him in a Way of doing it with the proper Implements of his Profeſſion.

The four coultered Plow will, in this Caſe, perfectly well anſwer the Purpoſe of the Spade; and this at one Stroke reduces the whole Expence, and throws the Article directly in the Way of the Farmer.

When this Plow is well managed it cuts full two Spit deep, ſo that it perfectly anſwers the Purpoſe of this expenſive digging by Hand; and by the Means of its numerous Coulters cuts, divides, and breaks the whole Subſtance of the Soil, even better than the Spade.

CHAP. X.

Of ſowing of Carrots.

THE Farmer is to make it his firſt Care, when he thinks of ſowing Carrots, to procure good Seed: this he will know by its ſweet Smell, its pale Colour, and its Roughneſs: if it be muſty or broken, 'tis damaged or old, and in either Caſe will greatly diſappoint him.

The Seed being choſen, he is to get to work upon his Ground in the Beginning of March. Gardeners ſow Carrots in a Manner the Year round, that they may have Crops of young ones one under another; but this the Farmer has nothing to do with. He ſows them for two Conſiderations, which are, to have large Roots for Market, and to get good Seed from proper Parts of his Ground, which is alſo very abundantly produced, and yields a very large Price.

The Beginning of March therefore is the Time when he is to prepare by plowing. His own Reaſon will direct him never to chuſe a ſtony Soil for this Root; but he muſt have a Couple of Women or Boys to follow the Plow, to pick up any looſe Stone or other hard Matter that may chance to be turned up.

When the Ground is thus deeply cut up and picked, the Harrows are to be ſent in, and the Surface is to be well leveled like the beſt prepared Border in a Garden: this done it is ready for the ſowing. When the Seed is a material Conſideration the Plants are to be kept farther diſtant, and the drieſt and warmeſt Soils are beſt for this Purpoſe.

There muſt be a great deal of Care in ſowing Carrot Seed, and a proper Day muſt be choſen, otherwiſe it will be impoſſible to do it as it ſhould be. The Weather muſt be ſtill and calm, and the Perſon who ſows them muſt go over all the Ground carefully, with the Seeds in his Apron, and muſt ſpread them by Hand a few at a

Time, and he muſt take Care that they fall ſeparate, for their rough Surfaces make them very apt to hang together. When any of them cling to one another, he muſt rub them in his Hands before he delivers them to the Ground, and by that Means thoroughly ſeparate them. His next Care is to ſee that they fall tolerably regular. And as to the Manner of their lying; one about every three Inches is the beſt Method, not that the Carrots are to ſtand ſo cloſe, but there ſhould be Seeds enough ſown that Accidents may be allowed for, and the Plants thinned by hoeing.

As ſoon as ever the Seed is upon the Ground, let a good heavy Roller be brought on, and the whole Field well rolled over with it. This ſettles the Seeds in their Places, and prevents the Effect of the Winds, which would ſpread them irregularly ſhould any riſe before they are thus fixed down.

This done, a very fine and ſhort toothed Harrow ſhould be drawn lightly over the Ground, and then the Article of Sowing is finiſhed. In theſe fine and well prepared Lands, the Harrow does not bury the Seed as it will where there are great Clods to be torn up. In this Caſe the rolling and harrowing only anſwers to the treading in, and raking of the Seed in the common Practice of Gardening; and they ſhoot up as regularly this Way as the other.

CHAP. XI.

Of managing a Crop of Carrots, and their Uſe.

THE Seed being in the Ground, is to be left to Nature for its ſhooting, and as ſoon as it is up, and got to ſome little Height, the Hand Hoers are to be ſent into the Field. They muſt have Orders to cut up all Weeds, and thin the Plants. The proper Diſtance at which they ſhould be left, is about ſeven Inches from one another; and thus they are to ſtand till they come to their Perfection; for the Ground having been once well weeded in this Manner, the Carrots will grow ſo vigorouſly, that their Leaves meeting every where one with another, will overſpread the whole Ground, and let no more grow between them.

The Carrots thus left to themſelves will grow to a very good Size by the End of Autumn, and they will thrive the better if Quantities are pulled for Market, from time to time, when they are big enough to be ſaleable, not drawing theſe all in one Place, but from thoſe Cluſters where they happen to ſtand thickeſt.

Toward the End of November the Leaves of the Carrots will begin to decay. The Farmer will know this by their becoming yelloviſh or reddiſh, this is his Notice for taking up the Roots. The Carrot like the Potatoe ſhould be taken up in the Beginning of Winter, and laid by in dry Sand, in which Manner they will always be kept ready for the Market.

The Froſt hurts Carrots in the ſame Manner as Potatoes, though not ſo early or ſo readily; therefore, as ſoon as that Time of the Year approaches, when they are to be expoſed to the Hazard, they muſt be taken out of the Ground and laid up in Sand, which Froſt does not ſo much effect as any other earthy Subſtance; and this muſt be in a dry Place, where they are defended from it in the beſt Manner.

This is the whole Management of the Carrot; it is eaſy and familiar in the greateſt Degree; and the Profit is great and certain: there is always a Market for this Root, and the Price is ſuch that the Profit proportioned to the Land and Labour is very great.

We have ſaid, in the Beginning of this Account of the Carrot, that the Root is not the only Article by which it is ſerviceable to the Farmer, for that there is a great deal of Profit from the Seed. This is the Produce of the ſecond Year, and for this Purpoſe the Plants may be either left in the Ground during the Winter, or ſet in again in the Beginning of Spring.

The Gardeners uſe the latter Method, but the Farmer will find the other beſt, becauſe there is leſs Trouble; only he muſt take Care that he chuſe the drieſt and warmeſt Part of the Field for that Purpoſe.

If the Carrots for Seed are planted, after being kept in Sand during the Winter, the largeſt and fineſt Roots muſt be choſen for that Purpoſe: in the other Method, of letting them ſtand through the Winter for that Uſe, the moſt vigorous Plants muſt be left. Theſe are to be kept at a due Diſtance, by ſeparating them in drawing the others. The drieſt and warmeſt, and beſt ſheltered Part of the Field, muſt be choſen, and they muſt be left at about a Foot aſunder, in this Condition they will gather Strength during Winter; the Stalks will riſe early the enſuing Summer; and the Seeds will ripen in Abundance about the Middle of August.

When thoroughly ripe the Plants are to be cut down with an Hook, and laid in the Sun and Air four Days to dry, frequently turning them. After this they are to be thraſhed, or the Seeds are to be beaten out of them; and when ſeparate they are to be aired and dried ſeveral Days before they are put up for Sale; they will thus be perfectly fine, ſweet, and well coloured, and will bring a large Price.

End of the Eighth Book.

A COMPLEAT BODY OF HUSBANDRY.

BOOK IX.

Of ſeveral advantageous Articles in Huſbandry, which are leſs univerſal than the others.

The INTRODUCTION.

THE Title we prefix to the preſent Part of our Undertaking, ſhews the Senſe we entertain of its Importance, in a Work of this Kind: 'tis to the Misfortune of the Huſbandman, when any thing that is in Reality advantageous, is not univerſally known, or generally practiſed. We ſhall recount ſeveral Kinds of Crops under this Head, that deſerve to be made common throughout the Kingdom; and ſhall lay down ſuch Rules for their ſeveral Managements, that thoſe who try carefully cannot miſs of Succeſs.

We ſhall begin with one Species, the Value and Profits of which are ſufficiently known, in thoſe Parts of the Kingdom where it is commonly raiſed: this is the Hop; and this, as it may be cultivated to the great Benefit of the Farmer, in many others, we ſhall hope to render more general.

CHAP. I.

Of Hops.

THERE are few Things by which the Huſbandman may enrich himſelf more than Hops; but there requires a general Knowledge of their Nature, the Ground they ſuit, and the Accidents to which they are liable, in order to his entering upon the Deſign with a rational Proſpect of Succeſs. The Management of them in the Planting, Growth, and Gathering, is alſo a peculiar Branch of the Buſineſs. This is at preſent confined to a few Counties, but as there are many other Places where it will ſucceed as well, we ſhall endeavour to make it univerſal.

The Hop is a tall weak Plant, that climbs by the Means of more ſubſtantial Things: naturally it runs up Hedges, and Art ſupplies it with Poles for this Purpoſe.

The Root conſiſts of thick black Strings, the firſt Shoots are thick, ſoft, and tender, like thoſe of Aſparagus, and are eaten in the ſame Manner. The Stalks, as they riſe higher, become rough and firm in their Subſtance. The Leaves are large and rough, and are divided like thoſe of the Vine. And the Flowers and Fruit grow upon ſeparate Plants. This is not ſingular to the Hop, for Hemp grows in the ſame Manner, as alſo Spinage, and many other Herbs leſs regarded. The Flowers are ſmall, greeniſh, and trifling. The Fruit is what we call the Hop, for the Sake of which the Plant is raiſed.

The Flowers being not ſucceeded by any Fruit, are called Male Flowers, this being the cuſtomary Expreſſion in treating of ſuch Plants. Each conſiſts of five, oblong, blunt, and hollow Leaves, within which ſtand five extreamly ſhort and fine Threads, each topped with a little Knob or Button.

The Fruit which grows in the Place of a Flower in the Female Hop, conſiſts of a general Cover or Caſe, divided into four Parts. Each ſeparate one conſiſts of four Leaves, and is of an oval Figure, and contains eight Seeds in their proper Receptacle; ſo that the whole Hop contains thirty-two Seeds. The Caſe in which each Seed is ripened, is of an oval Form, and made of one little Leaf, in which riſes a little Button, terminated by a ſlender Filament, and divided into two ſpreading Threads. This

Button becomes the Seed, which when ripe is roundiſh, covered with a Kind of Coat, and is lodged in the Bottom of the Caſe.

This is the exact Structure of the common Hop. Eight of theſe Seeds within Caſes, are encloſed in each Diviſion of the general Fruit, four of which make up the whole.

The Flowers of the Male Plant are not uſeleſs, as the Vulgar ſuppoſe. Though they produce no Fruit themſelves, they are neceſſary to the ripening of the others. Every Fruit has its Rudiment in the Bottom of the Flower, and the Duſt in the little Heads in the Middle impregnate it, otherwiſe it never ripens. In moſt Plants theſe little Heads are in the ſame Flower with the Rudiment of the Fruit or Seed, as in the Tulip and others: in ſome they grow in ſeparate Flowers, upon the ſame Stalks; this we ſee in Melons and Cucumbers: and in ſome, the Flowers having theſe little Heads in them, grow on one Plant, and the Rudiment of the Fruit in another of the ſame Kind. This is the Caſe in Hops, and in Hemp, Spinage, &c. as we have ſaid already. This is the Courſe of Nature in providing for the ripening of the Fruit of this uſeful Plant.

It does not appear by any thing in the Works of the Antients, that they were acquainted with the Hop. PLINY is the firſt who names it, and that only as a Sallad Herb. But we are not to wonder we read nothing of it before his Time. The GREEKS ſtudied Utility; and the Uſe of the Hop in Malt Liquors, which is its great Service at this Time, was not known to them. They had Malt Drinks, but they were not made for keeping; Lupulus is the Name by which it is called by PLINY, and others; but it is become a Faſhion lately, to call it Humulus.

The Hop is a wild Plant in ENGLAND, and moſt other Parts of EUROPE, and it naturally loves a damp Soil at the Foot of a Hill, we find it in ſuch Places crawling up the Buſhes in Hedges; but its Value occaſions it to be cultivated with Care, in Grounds choſen for that Purpoſe. We ſhall proceed to give the practical Huſbandman an Account of it.

CHAP. II.

Of the ſeveral Kinds of Hops.

TO ſpeak with Strictneſs there is but one Kind of Hop; for what are mentioned under different Names, whether among the Writers on Herbs, or the Planters, are only Varieties of the ſame Plant, as Culture and other Accidents have changed it. However, as ſome of theſe keep their Difference in planting, we who write for Utility, not Curioſity, may very well diſtinguiſh them according to the Cuſtom of others, into theſe ſeveral Sorts.

In Books we meet with an Account of the Male and the Female, of the wild and the Garden Hop. What is meant by the Male and Female we have ſhewn. As to the others, the Difference is only that made by proper Care, from the Plant in its natural Wildneſs.

When we ſpeak with the Planters, they tell us there are four Kinds of Hops. Theſe are the beſt Directors for the Huſbandman, and we ſhall therefore follow their Diviſion. The four Kinds are theſe: 1. The wild Garlick Hop. 2. The long and ſquare Garlick. 3. The long white. And 4. The oval. The firſt of theſe is what Authors call the wild Hop, the three others they confound together under the Name of cultivated Hops.

The wild Kind is poor, ſmall, and not worth Notice. The long and ſquare Garlick is a well taſted Hop. But 'tis ill-coloured, for which Reaſon it does not bring ſo good a Price; the Fault in this Reſpect is a Redneſs which it always has about the Stalk. The Long-white is the moſt beautiful Hop, and the moſt valuable, becauſe of its greater Encreaſe, and the next to theſe are the Oval; theſe are ſhorter than the Long-white, but otherwiſe equal in Colour and Flavour.

It would be natural to ſay that none but the Long-white ſhould be cultivated, becauſe theſe are the beſt and moſt plentiful in the Produce, but 'tis not every Land that will bear them. They will live in any, but to thrive they require what is very good, and a thriving Crop of the long and ſquare Garlick, is better than a ſtarved one of the other.

Therefore let the Huſbandman who ſhall think of raiſing Hops, ſuit the Kind to his Land. All Hops love a very mellow rich Soil, but the long Garlick being moſt of the Nature of the wild Hop, will bear a poorer Ground better than the others.

The proper Soil for a Hop Ground is a rich Garden Mould. But as this is never found entire, we are to tell the Farmer that of its two general Mixtures, which are Sand and Clay, the Clay makes it unfit for Hops; but the Sand, in a moderate Quantity, is not hurtful.

In order to plant Hops with any Proſpect of Succeſs, the Soil muſt be deep and well conditioned to the Bottom.

If the Ground on which the Huſbandman intends to raiſe his Hops be pure and fine Mould, let him plant the Long-white, and no other Kind. If it have a moderate Mixture of Sand, let him plant the Long-white and Oval together, for they will do very well in the ſame Ground. If it be much inclined to Clay he is not to uſe it for this Purpoſe, but if only ſomewhat clayey, and he will have it a Hop Ground, he muſt plant the long Garlick. Before the Huſbandman fixes upon his Deſign, let him not only examine the Condition and Depth of the Earth, but what is under it. The deepeſt Soil does not reach far, and in all Growths a great deal depends upon the Nature of the Bottom, but in none more than this. A Clay Bottom is too cold, and retains too much wet; and a gravelly Bottom lets it through too faſt, ſo that they have not enough to nouriſh them, for the Hop being a tall Plant requires a good Quantity of Moiſture. A loamy Bottom is the beſt. That Sort of Earth of which Bricks are made, is of a very fit Kind, and is a very common Bottom to the Soil in moſt Places. Let the upper Coat or Soil be light and rich, and it matters not for the Colour. The ESSEX Hop Grounds

are on a moory Land, which is black; and many of the Kentish are upon a whitiſh crumbly Soil, they ſucceed equally well, all that is required being a Quantity of good Ground, wherein the Roots can run with Eaſe, and find a due Quantity of Nouriſhment.

CHAP. III.

Of the proper Land for a Hop Ground.

WE have ſhewn, in a preceding Part of this Work, that Plants in general ſend their Roots deeper and farther in Search of Nouriſhment, than is commonly thought: none go deeper or farther than Hops; for this Reaſon, in preparing Land for them, if the upper Part be a great deal better than what is under it, as is generally the Caſe, the Work muſt be done in the Way of trenching, and the fine Part of the Soil buried undermoſt. What is at a Depth being much more eſſential to this Plant, than what is near the Surface.

When the Piece of Ground fixed upon for this Purpoſe is over moiſt, it muſt be laid up in high Ridges, to be well drained. And when it has been thus rightly managed at firſt, it muſt be kept in the ſame Condition, by keeping the Drains open and clear, otherwiſe the Roots will be deſtroyed in Winter.

We have obſerved that clayey Soils are to be avoided, and there are two others nearly as bad, theſe are, the gravelly and rocky. In neither of theſe Hops will ever anſwer, but in any others they may be raiſed; and if the worſer Kinds be planted on the more indifferent Lands, and the finer reſerved for the beſt, with due Care they will never fail.

Hops root ſo deep, and ſpread ſo far, and draw ſo large a Quantity of Nouriſhment, that they exhauſt a Land extreamly. They may therefore be planted after almoſt any other Growth, but no other will thrive after them except Trees, which root deeper, and ſpread farther than they.

For this Reaſon a Piece of Ground that has been exhauſted by other Crops, which do not root deep, will raiſe Hops very well, though an entire new Piece of Ground does better; if any one ſhould break up a Piece of Saintfoin for Hops, let the Soil be what it would, they would never proſper well, becauſe that Graſs having rooted as deep as they, had drained the Earth of its Nouriſhment ſo far as they can reach: but on the other hand, if a Piece of Corn Land that will no longer bear Crops without Refreſhments, be turned up for a Hop Ground, it will ſucceed very well if the Soil be proper, becauſe Corn roots ſuperficially, and the Earth at that Depth which Hops reach is left unexhauſted. But a Piece of Virgin Land is better than this, becauſe in that the fine unexhauſted Top of the Soil may be turned in under the other, and no Land can afford them ſuch excellent Nouriſhment.

Therefore let the Planter obſerve that he take the beſt Ground he can find, if he have his Choice; and knowing that it will be fit for Hops only a certain Time, and fit for no Crop afterwards, let him prepare accordingly.

Saintfoin, which roots deep, leaves Land in a very good Condition for Corn, becauſe it ſpreads very few Fibres near the Surface; but on the contrary, the Hop ſpreads its Roots deep and ſuperficially too, ſo that 'tis fit for nothing afterwards but Trees.

A good Piece of Land reduced from common Tillage, will ſupport Hops very well eight Years: a Piece of Virgin Earth, if the Soil and every other Circumſtance be favourable, will ſupport Hops twelve Years; but not longer to Advantage. Let the Planter take the proper Care therefore in Time.

When he has laid his Deſign for a Hop Ground, let him plant it alſo with Apple and Cherry Trees at the ſame Time.

Theſe will draw but little Nouriſhment while young, and therefore the Hops will very well ſtand twelve Years with Advantage. At the End of this Time the right Practice is to make a new Hop Ground in another Place. By this Time the Cherry Trees will bear. They will continue improving every Year for ſome time, and will laſt very well five and twenty Years; at the End of this Time they may be cut down, and the Apple Trees will be in fine Order.

Let it be remembered that the Hop, in its wild State, loves a ſheltered Place, at the Foot of a Hill; and let the Planter chuſe his Spot accordingly, for Nature is an excellent Guide. A Piece of Ground that lies low and warm, open to the South, and well defended by Trees on the other Quarters, is the favourable Spot for Hops; if the Soil be deep and good in ſuch a Piece of Ground, no Way of employing it can turn to ſo great Account. If ſuch a Sheltering is wanted naturally, it muſt be raiſed by Art, and there muſt be Water near. Theſe are the Requiſites.

CHAP. IV.

Of placing the Hills.

WHEN a Piece of Ground is fixed upon, which has all theſe Requiſites, and a proper Quantity of Plants of a Kind ſuited to its Nature, are in Readineſs to be taken up occaſionally for it, the Ground is to be prepared for their Reception.

Hops are planted on ſo many little Hills, and theſe are to be placed at ſuch Diſtances as are beſt ſuited to the Extent of the Ground, and the intended Manner of dreſſing.

If the Piece be ſmall, the Breaſt Plow or Spade muſt be uſed for dreſſing the Ground, when the Hops are upon it: but it is much better to ſet out with a larger Piece, and diſpoſe the Plantation for Horſehoeing.

Whichever Method be taken, Time and Pains are required to put the Ground in proper Order. October is the Seaſon for planting the Hops, but the preparing the Ground is the Buſineſs of a Month before. The firſt Thing that muſt be done is plowing it up, and laying it very even.

The

Hops

Garden Flax

Male, or Steel Hemp

Female Hemp

Woad

Common Would, or Deers weed

The Coleseed Plant

Common Liquorice

The Saffron Plant

Bastard Saffron

Madder

Garden Teasell

Anise

Carrawary

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The Spade may anſwer this Purpoſe in a ſmall Piece of Ground, but larger are in all Reſpects better.

The Intent of this plowing or digging is to break the Ground very ſmall, and to a conſiderable Depth. The proper Plow therefore is the four coultered one, deſcribed before, ſet to its greateſt Pitch; in this Condition, with the Guidance of a ſkilful Plowman, it will cut two Spit deep, and tear the Ground all to Pieces the whole Way. When the Ground is thoroughly broke and divided by this Plow, let a Harrow be drawn over it; and laſt of all a light Roller. It will then be well broke, and will have an even Surface: this is the Condition wherein it is fit for laying out for the deſigned Plantation.

The next Thing is to determine what ſhall be the Diſtance of the Hills, and when this is ſettled a long Line is to be procured, and a Knot is to be tied in it by Meaſure, at every Diſtance that is ſettled for a Hill.

As to the Form that muſt be determined by the Ground, if that be ſmall, and the Spade or Breaſt Plow are to be uſed, then the beſt Method is the Quincunx, which diſpoſes the Hills in Lines, and leaves regular Alleys every Way between them, but in larger Grounds 'tis beſt in Squares.

The Line is to be drawn ſtrait acroſs the Ground, from Place to Place, according to the determined Diſtance, and a Stick is to be fixed down at every Knot. This marks the placing of the Hills.

When the Soil is thus turned and mixed together, the Planter will be better able to judge of it than before; and if it want Richneſs let him amend that Fault, by adding ſome good Stuff to the Places which are marked for the Hills; theſe being the Spots where the Plants are to be ſet.

It is very rarely that a Piece of Ground is ſo perfectly good, as not to admit of this Improvement, and as it is very great, and of no vaſt Expence or Difficulty, 'tis always worth while to do it.

We ſhall therefore adviſe the Huſbandman in general, to plant his Hops in a Compoſt, and the beſt Method of making it is this. Dig a Quantity of rich Virgin Mould, or other very good and fine Earth, proportioned to the Number of Hills that are to be raiſed; add to this one fourth Part the Quantity of very old and well rotted Dung, and about a tenth Part of ſharp Sand, let all this be well mixed and ſtand in Readineſs. Then at every Stick open a Hole two Foot deep, and a Foot and half ſquare, fill this with the Compoſt, and all is ready for the Plantation, which will thrive vaſtly the better for this previous Care.

We have not yet laid down any exact Direction for the Diſtance at which theſe Holes are to be opened, and indeed the Diſtance of the Hills is one of the niceſt Things in the whole Buſineſs. Neither can any general Rule be given about it: for the Nature of the Soil, and Extent of the Ground, and intended Manner of working, will make Variations. In general about eight Foot Diſtance is the neareſt they ſhould ſtand.

As we have ordered the Farmer to ſow more Seed upon his poor Land, than upon that which is rich, ſo in the planting the Hop Ground we ſhall follow the ſame Method, and adviſe him if the Soil be worſe than ordinary, to make his Hills at ſeven Foot Diſtance, and if it be very rich and fine to ſet them at nine Foot. If it be at any time found either in a new Ground or an old one, that it will nouriſh more Hops than there are upon it, the beſt Way is to add to the Number of Plants upon each Hill, and not to multiply the Hills. So that for this Reaſon the Planter need not be afraid he ſhall place them too diſtant.

CHAP. V.

Of planting the Hops.

THE Hills being thus prepared, are to be planted; and Care muſt be taken in the providing ſuch Sets as are excellent in their Kind. Let the Huſbandman truſt no Eye but his own for the Choice, and let him obſerve the following Cautions.

Firſt let him conſider the Kind, and next the Place where they have grown, for this is very eſſential. We have already ſaid what Kind ſuits each Soil, and let him take Care to follow that Direction firſt.

Next let him conſider the Soil from whence he has them; here there are two eſſential Points, which in a Manner contradict one another. 'Tis neceſſary he ſhould have the ſtrongeſt and moſt flouriſhing Sets he can procure, and 'tis beſt that he have them from a poorer Ground than his own. Let him be ſure they do not come from a richer Soil, for then they will certainly dwindle: but let him chuſe the ſtrongeſt Shoots of a middling Piece of Ground; for his Compoſt into which they are to be ſet will certainly exceed that in Richneſs, ſo that they will be forwarded for the firſt Shoot; and the whole Ground being newly ſtirred, they will ſpread their Roots without Difficulty, when they have ſhot them beyond its Extent.

When the Planter goes into a Ground for purchaſing his Sets, let him, after he has conſidered the Soil, examine the Height of the Hills. Nothing ſo ſtrengthens the Shoot of the Hop, as the raiſing the Hill high. Let him therefore chuſe them from ſuch Hills as have been moſt raiſed the preceding Year, and from ſuch as are fulleſt of Shoots; becauſe this alſo is a Sign that the Roots whence they come are hearty; and where there are moſt of them, they are always, while thus young, the moſt vigorous.

Having fixed upon the Hills let him fix upon the largeſt Sets, and ſee them taken carefully up, they ſhould be about ten Inches long, and have four Joints or Buds. When a proper Quantity are taken up, according to the Number of Hills there are to be, let them be laid in the Ground in a cold and damp Place, and taken out as the Holes are prepared for their Reception.

In the Center of every Hole that has been filled up with the Compoſt, let there be a ſquare Opening made of a Foot deep, throwing up

the Earth on the Sides. Into this Hole, which muſt be the full Foot deep, put four of the Sets. Place one at each Corner. Set them upright, with the Top juſt level with the Surface of the Ground, and then throw in the Earth that had been dug out, fixing it well about the Roots. Cover the Tops about two Inches with the fineſt and lighteſt of the Mould, and the Hole is finiſhed. Thus the Foundation of one Hill is laid.

In the ſame Manner plant four Sets in each Hole, covering their Tops, and burying the whole Set ſtrait, and cloſing the Mould about the Roots.

About a thouſand Hills will very well ſtand in an Acre of Ground, ſuppoſing it of the middling Kind, and this is the whole Trouble of planting them. The Expence is not great, for the Sets are ſold cheap enough, and an expert Perſon makes quick Work in ſetting them.

The Huſbandman ſees the Eaſe with which Hops are raiſed, we ſhall now tell him the Encouragement he has to plant them. No Produce whatſoever is equal to them: they may reaſonably be expected to yield fifty Pound an Acre, and ſometimes in favourable Seaſons, when the Soil and Situation are right, an Hundred.

Theſe Things conſidered, nothing is more ſurpriſing than that Hops are not propagated univerſally: at preſent the Planter need not be afraid of over-ſtocking the Market. The Demand is greater by much than the Supply, and we annually import a vaſt Quantity of them from Flanders, though vaſtly inferior to our own. No Country ſo much favours their Growth as England; nor is there any County throughout the Kingdom where they may not be raiſed to this certain and vaſt Profit, and with this perfect Eaſe.

Theſe are the common Rules obſerved in puting the Sets into the Ground; but as this is an Article of the greateſt Conſequence, the whole future Advantage depending upon it, we ſhall enlarge upon the Particulars to be conſidered reſpecting it.

Let the Planter ſee that his Holes are open and perfectly prepared, before the Sets that are to go into them are taken out of the Ground, for the beſt Care that can be taken of them is the clapping them quickly into their Places, nothing prejudicing them ſo much as keeping them long out of the Earth.

In the taking them up the greateſt Caution is to be uſed, not to bruiſe the Roots; and whatſoever Parts of them may happen to be ſo injured, muſt be cut off beyond, that is, above the bruiſed Part, for this always decays; whereas, when the Roots are cut off clean, they not only are ſo many Mouths themſelves, but every one of them ſhoots out ſeveral ſmall Roots; which does not happen if they be cruſhed and injured. Theſe Parts grow preſently mouldy, and the Infection ſpreads from them to the reſt of the Plant: every Fibre that runs near one of theſe mouldy ones is ſure to be tainted. Not only the Fibres are to be cut off at the Ends, and the injured Roots to be cut away, but if there be any Roots that run croſswiſe of one another, or any that ſpread with a Tendency upward, the firſt are to be cut quite off, and the others are to be ſhortened almoſt to the Set. The croſs Roots, if too near, will preſs and injure one another; and the Hop is to root deep in the Ground, therefore the others ſtruggle in a wrong Manner.

As to the Depth of the Holes made for receiving the Plants, what we have given is a general Rule, but it may admit of Exceptions; and we are in this Article to accommodate ourſelves to the Condition of the Ground. If that be rich, free, and fine, we may plant the deeper, but if it have a bad Bottom we muſt go the ſhallower in the firſt ſetting, leaving the Plants to puſh afterwards.

When the Hole is dug and the Plants are ready, let the Planter obſerve that he ſet them ſo, that as near as may be they may ſtand covered juſt as far as the Point or Head; and when the Hole is ſquare, four are to be placed at the Corners; and if one more be added, it muſt be juſt in the Center; if two more, in a Line going acroſs the Middle, and at equal Diſtances from all the other.

When the Sets are in the Hole let the Compoſt that is to fill it up be broke very fine with a Spade, and thrown in a little at a Time; and in this Manner it will fall all round them, and about each Set, leaving no Hollows. When a little is thrown in it is to be ſettled about them with the Hand, and when all is in it is to be gently preſſed with the Feet, but not too hard: the Intent is, that it may every where fall cloſe about them, and yet it is not to cake about their Stems.

Some who plant in Spring, if the Seaſon be dry, water their young Sets, but this is altogether wrong. The Depth at which they are planted is ſuch, that the Earth will always have Dampneſs enough to ſupport them, and it is a Seaſon when there muſt come Rains ſooner or later upon them.

We have recommended the planting at Autumn, and then there is not the leaſt Hazard of wanting Water, nor the leaſt Occaſion for giving it to them; on the contrary, when People over careful of their new Plantations, will be at the Labour and Expence of doing this, they only injure the Plants; for the Wet, eſpecially if it be too much, rots the Roots. We have obſerved that the Root of the Hop is very liable to Accidents, it will grow mouldy if bruiſed, or on any other ſlight Injury, and nothing will contribute more to that Accident than too much Wet, ſo that the over Care often is deſtructive.

There are People who, inſtead of opening the whole Hole, and ſetting in the Plants regularly by Hand, place them in the new made Ground with a ſetting Stick, cloſing the Earth about them as Gardeners do in the common Way of planting Roots, but this is a very ſlight and inconſiderate Method: the Hop Plantation is an Undertaking of great Conſequence, and 'tis worth while always to ſet about it with Care, and all poſſible Advantage of the Ground: the Succeſs of the firſt Year will over-pay any extraordinary or particular Expence on that Head.

When the Planter has thus got all his Sets into the Ground, let him leave them to Nature

for their Growth; and the next Summer let him watch them in their Fruiting, ſome will riſe worſe than others, but at the ſame time he will find ſome better than the common Run; in this Caſe he is to mark the Hills of both Kinds, the worſt to take away, and the better to propagate. For this Purpoſe let him take particular Care of thoſe Hills on which the fine ones grow; and the next Year, when the Time of tying is come, the ſuperfluous Shoots on theſe fine Hills are to be reſerved for laying. When the others are tied up theſe are to be cut off at the Top, and laid all the reſt of their Length, burying them in the Ground; in this Condition they will each ſend up a great Number of ſtrong and healthy Sets, which in the ſucceeding Autumn may be planted out into Places where the Hops were worſe than the common Run; in this Way every Year the Hop Ground will be improving, and by proper Management in Dreſſing, and due Tendence, will exceed that of any other.

CHAP. VI.

Of dreſſing and managing a Hop Ground.

WE have ſhewn how to prepare the Land and plant the Hops; but if we were to ſtop here, the Huſbandman who ſhould be led to plant, and left without farther Inſtructions, would be bound to curſe us for deceiving him; ſo it would really prove, ſhould he be left in the Dark, for the Management of his Plantation. The Profit from the Hop is very certain, though it vary greatly, according to the Seaſons and Accidents; but this certainly ſuppoſes a due Knowledge and Care in the dreſſing of the Ground, for it will be ſix Times as great from a Ground well, as from one ill managed. He is not to look for this Information among the Planters themſelves, for they know very little, and that little they keep very ſecret. Half their Plantations come to little, from want of Care or want of Judgment; and from what I have ſeen I ſhall freely add, that the very beſt of them do not yield half their natural Produce.

There is not any Hop Ground I have ſeen but might double the Owner's Profits, with a more judicious and diligent Management: we ſhall lay down the whole Method, and it will be found not at all difficult or perplexed, only when ſo familiar a Practice is rightly underſtood, let it be carefully followed and obſerved in every Article. Let not any be afraid of the Expence of managing a Hop Ground, for it is really very moderate; nor let him be terrified at the Plantation being liable to Accidents; for though it is more ſo than any other Growth whatſoever, yet with due Care one half of them may be prevented, and the greateſt Miſchief of the other remedied. Of this we ſhall treat at large in a ſucceeding Chapter, not to break in upon the Thread of the Subject here.

The firſt dreſſing of the Hop Ground depends upon two Principles, the Earth is to be broken and divided that the Roots may find an eaſy Paſſage; and the Weeds are to be deſtroyed as they riſe, that they may not rob the Plants of their Nouriſhment. There is no Way of doing this ſo proper as by the Horſehoeing, becauſe that at the ſame Time as it deſtroys the Weeds, breaks the Ground thoroughly between the Hills; and the Hops ſoon ſpread beyond them into the Ground.

The young Plants will now have the Winter for fixing themſelves in the Earth, they will ſhoot out freſh Roots before the Cold reaches the Depths at which they are planted; and theſe will ſtrengthen themſelves well in the Ground before Spring, that they will then ſhoot vigorouſly both in Roots and Tops.

CHAP. VII.

Of polling the Hops.

THE Poles are now to be provided, for the ſooner they are fixed the better, that the Roots may not be diſturbed in their new Shoots by them.

Three, four, or five Poles muſt be allowed for each Hill: the Difference is according to the Diſtance of the Hills; if theſe be at ſeven Foot three Poles will do for each, if at eight Foot four, and if the Ground be very rich, and the Diſtance of the Hills nine Foot, there ſhould be five Poles to each. In general the poorer the Land the nearer the Poles may be placed, for where that is rich, and the Growth is luxuriant, they muſt be at a greater Diſtance.

In the ſame Manner the Bigneſs and Length of the Poles is to be proportioned to the Condition of the Ground, and the Growth of the Hops. In moderate Ground Poles of a moderate Size will do, but in rich Earth, where the Hills are diſtant and the Growth ſtrong, the Poles muſt be large, ſtout, and very tall, otherwiſe a great Part of the Profit may be loſt from this Deficience.

The Growth of the Stem of the Hop will be in a great Meaſure determined by the Length and Bigneſs of the Pole; if that be tall the Stalk will run up, and if the Ground be but poor when this happens, the whole Nouriſhment will be exhauſted on the Stem and Leaves which ſhould go to the Hops, ſo that they will make but a poor Progreſs. This is the Caution neceſſary againſt over-polling the Ground, than which there is no Error more deſtructive. On the contrary, when the Earth is rich and able to ſupport the Plants, and when the Hills are placed at ſuch a Diſtance that there is Space for the Roots wandering for Nouriſhment, and that is provided in Abundance by the dreſſing of the Ground between, in that Caſe we can get no Poles too long; for there are none ſo high but the Stem of the Hop can get to their Top, and flouriſh over it, and yet have Strength at the Root for nouriſhing and filling the Fruit, which will be the more numerous in proportion as the Plant is larger and ſpreads more.

We are now ſpeaking particularly of the firſt Year of a Hop Ground, and in this ſome particular Caution is neceſſary. If the Ground be but indifferent, let the Poles be very ſhort this firſt

Year, for nothing is ſo dangerous as the carrying up the Plants too much in Height the firſt Seaſon in ſuch Ground: where they have no Abundance of Nouriſhment, and have not been able ſince their planting to ſearch thoroughly for what there is. If they be led into a Habit of running too much into Stem this firſt Year, the Fruit will be ſmall, and perhaps the Fault may never be recovered.

Even in the beſt Grounds where ſoon after no Poles can be too long, it is a very good Caution to uſe ſuch as are ſhorter the firſt Year, not tempting the Plants to run up too high, but encouraging them into Fruit. They will be ready enough to take the Advantage of the longeſt Poles afterwards, and fill the whole Length with Fruit.

An Acre of Hop Ground will require between three and four thouſand Poles. Let theſe be got ready, and early in Spring laid in upon the Ground between the Hills, to be in readineſs. Fifteen Foot is a moderate Length. The largeſt Poles which are fit for the richeſt Ground and beſt Hops, ſhould be twenty Foot long, and ſeven Inches round, but theſe are too large for any Ground or any Condition of the Hops the firſt Year; ſo that ſomewhat ſmaller are better in all Kinds in the Beginning.

Alder Poles are very proper, they are ſtrait and run high; Aſh alſo are excellent, becauſe of their Toughneſs, and there are ſome other Woods that do well enough. They ſhould be cut with a Fork at the Top, for it ſerves to give a Support to the Head of the Plant, and is of the greateſt Service.

The Time of polling is one of thoſe Circumſtances that require the greateſt Care in the Management of a Hop Ground, it muſt not be done before the Shoots appear above Ground, becauſe the Plants may be injured by it, and the proper Place cannot be known; and on the other hand, if it be deferred long after they have ſhot, the Plants will be checked, for the Hop ſtops preſently in its free Shoot, if it have not a Support to climb upon. This Work is to be begun after the Shoots appear, and muſt be finiſhed before they are any where three Foot high, and this in a large Ground is a ſharp Buſineſs, for the Hop grows very quick in its firſt Shoot. The Poles are to be fixed near each Hill, three, four, or five to each, according to the Rule before laid down, and they are to be fixed in Depth according to their Height, and to the Condition and Expoſure of the Ground. The richer the Ground the deeper they muſt go, and the more they are expoſed the firmer they muſt be placed; indeed we have obſerved that a Hop Ground never is to be in an expoſed Situation, ſo that the Danger there ought not to be great.

Let the Planter conſider that nothing is ſo deſtructive as the riſing of a Pole out of the Ground: the breaking of one, though a troubleſome Accident, is not near ſo bad, on this Principle let him work, fixing them in the Grounds ſo firm, that if ſuch Violence is offered they will ſooner break than riſe.

There is a great deal in the fixing them, not only in Point of Strength but Poſition, they muſt always be placed ſo as to lean a little outward, though not much. It is natural to plant them a little ſlanting inwards, and ever ſo little of this is wrong. The Hop, more than any Plant whatſoever, requires a free Air to paſs all round it, and this is prevented by the Poles bending inwards. Moſt of thoſe Diſorders of Hops, which are ſo injurious to the Planter as we have ſhewn before, ariſe from the Want of a free Paſſage of Air, this we ſhall explain at large in its Place. The naming it here may be ſufficient to give the Planter a Caution not to let his Poles ſlant inward; if this be ever ſo little, the Weight of the Hops will ſoon make it more, and they will cloſe in at the Top like a Canopy over the Hill, the Conſequence of this is a certain Taint in the Hops.

To prevent this it is that we order the Poles to be fixed ſlanting a little outwards; but let Moderation govern here, if they ſlant too much the Weight of the Hop will lean them down the other Way, which is alſo wrong. The Buſineſs is to keep them as upright as poſſible. Therefore let the Planter obſerve how the Tops of the Poles ſtand when he has fixed them; if they are a very little more diſtant at the Top than at the Bottom they are right, not otherwiſe.

Another Caution is, that they are made to lean a little toward the South. This is very eſſential, for it gives the Sun Opportunity to ſhine in among them; which is of the utmoſt Conſequence. Hops perſpire a great deal, and that damp Vapour is apt to hang amongſt them. This taints them, and is the Origin of many of their Diſorders. The Sun ſhining freely in at the ſame Time, diſpels this and warms the Plants, it keeps them from Damage, and aſſiſts the Growth and ripening of the Fruit. This leaning however muſt be but moderate, as the other, for if great it prevents the very Intent wherewith it is done, for the Plants will obſcure one another, and the Sun cannot get in.

We have obſerved at firſt, that great Care is needful in the Management of a Hop Ground, it will be ſeen in this Article the ſtricteſt Nicety is required in this Inclination of the Poles. It is confirmed by repeated Experience, that a Pole which leans a little will bear one third more Hops, than one under all the ſame Advantages in other Reſpects, that ſtands upright: but of this I can aſſure the Planter, from my own Experience alſo, that a Pole which leans too much will yield fewer Hops by one third than one which ſtands perpendicular: and beſide the Defect in its own bearing, will hinder that of others.

There is alſo another very ſubſtantial Reaſon againſt the too great leaning of an Hop Pole, that is, the Danger of its breaking, which is a bad Accident, or of its tearing up, which is a ſtill worſe, when the Weight of the Hop bears upon it.

CHAP.

CHAP. VIII.

Of inſpecting the polling.

AN Accident in the polling of Hops, if a careful Eye be kept over them, and it be ſeen in Time, is eaſily remedied; and there ought to be ſuch an Eye continually upon the Ground, to inſure the full Profits.

Firſt, if upon the ſhooting of the Hop at ſix or ſeven Foot high, it be ſeen to be over-polled, that is, if the Pole be ſo tall that it will be apt to carry it up in Length, and prevent its fruiting well, it may be unwound from the Pole, that may be taken up, and another may be ſet in its Place, and the Hop brought carefully round it, and it will take to it as naturally as to the firſt. In the ſame Manner if it be ſeen, from the free growing and promiſing Aſpect of a Plant, that it is under-polled, or that it will bear a taller and ſtouter, it may be unwound, and ſuch a one ſet in the Place of the other.

In the ſecond Place let the Planter go through his Ground, and inſpect carefully the Condition of all his Poles, as to their Firmneſs in the Earth; let him be particularly careful in this Reſpect, in Places where the Wind has moſt Power. When he ſees any in Danger let him order a Man with a Rammer to force down the Mould, on the Side of the Pole oppoſite to the Wind, which will enable it to reſiſt the Efforts.

Thirdly, let him take Care to have ſpare Poles of different Sizes, not only for the replacing ſuch as are too ſmall or too large for their Plants, but for the ſupplying the Place of ſuch as ſhall break, for this is an Accident that will happen; and it muſt ſpeedily be remedied. A Hop Plant that is ſuffered to lie upon the Ground, will yield very little.

Fourthly, let him be ready not only to remedy ſuch Accidents, but to prevent them. He will ſee where a Pole is over-burthened and in Danger of breaking, and let him not ſtay for the Accident, but place in a ſpare Pole to ſupport the other.

And finally, where he has not perceived in Time, that a Hop was under-polled, but ſees it requires a taller Pole, when it is too late to unwind it, let him place a ſquare Pole near the other, and trim the Hop to it, that it may have a freſh Support, and Room to ſpread to the greateſt Advantage.

CHAP. IX.

Of the tying of Hops.

THE Huſbandman who ſhall have a Deſign of entering on the Hop Branch, though ever ſo unacquainted with it before, and ever ſo much out of the Way of Inſtruction from thoſe who practiſe it, will find here ſufficient Directions under every Article; and provided he will obſerve carefully the ſeveral Directions, and keep a conſtant Eye upon his Ground, we will venture to aſſure him of Succeſs.

He has ſeen how he is to prepare his Ground, plant his Sets, and fix his Poles. The next Article is the fixing the Plants to theſe Poles, this is done by tying.

According to our Directions of not ſetting in the Poles till the firſt Shoots appear, it will be time to begin tying by that Time they are all well in the Ground. For the proper Time to begin to lead the Plant is at about a Yard high.

Let the Ground be now carefully looked over, let it be conſidered what each Pole may bear, and ſo the Plants proportioned to them. This done let each Shoot be led to the proper Pole, which is uſually the neareſt, and let it be wound once or twice about it, in a Direction according to the Courſe of the Sun, for the Heat naturally draws the Shoot that Way, and the Courſe of Nature is not to be perverted.

When it is thus fixed to the Pole it is to be tied round, to keep it there. Any ſoft Matter does for this Purpoſe, a Piece of Baſs or withered Ruſh, or a Fragment of Yarn. Care muſt be taken that the Stalks of the Hop be not hurt in the tying. Let them be tied in two or three Places, but let a great deal of Caution be uſed in doing it, that they are not preſs'd, for the young Shoots are tender, and the damaging of them will be of very bad Conſequence. The Heat of the Day is the beſt Time for the doing this, for in the Morning, being full of Juice, they are brittle: The Heat of the Sun evaporates ſome of it, and they are then more firm or will better bear a Touch.

After this there muſt be no more tying, but the Plants will ſtill require a great deal of guiding, to keep them properly to the Poles. We ſhall be now advanced to the ſecond Stage of Growth, and our Hops which have been tied ſome little Time, will continue ſhooting very quick; and in general, if they have been carefully wound and tied, they will follow the Courſe intended round the Pole, very freely and favourably. But there will have been leſs Care taken of ſome, for no Work is ever done throughout with perfect Regularity, and there will be ſome Plants very luxuriant and very croſs-grained, that will ramble from their Poles, and hang wild and drooping; theſe muſt be ſet right with the Hand, for the firſt Week or ten Days: toward the End of APRIL the Planter muſt himſelf go over his whole Ground again, and ſee what farther is amiſs in the ſame Way: ſomething will ſtill be amiſs; and no Hand is ſo fit to rectify it as his own. No one's Intereſt is ſo much concerned, and therefore no one will be ſo careful; the Tops which ſtraggle from their Poles, will now be above the Reach of his Hand; he muſt therefore take a forked Stick, of five or ſix Foot long, and with this he muſt turn and direct them properly to the Poles, which they will readily enough take to when once put round, though they had ſtraggled naturally ever ſo much from them.

A Fortnight after this, that is, toward the Middle of MAY let him go round once again, with the ſame Deſign. His Workmen muſt have

have general Orders to rectify what is caſually amiſs, from Day to Day; but theſe are the Periods whereat he ſhould go through the whole himſelf; and they return ſo quick, that if it be a conſiderable Ground they will allow him little Reſpite. When we adviſe this compleat Attendance to be given by himſelf, we ſuppoſe the Ground to be but of a moderate Extent, and the Planter not very much preſſed by other Affairs. When the Ground is larger, and the Owner has Affairs that will not permit himſelf to attend, he muſt depute ſome careful and faithful Perſon; and ſtill follow at Times with his Eye, what he does not execute with his Hand.

At this Inſpection in MAY, whether by himſelf or a Servant, the greateſt Care of all is required for two Reaſons; firſt, becauſe it will be the laſt Time of going over the Ground; and ſecondly, becauſe Faults at this Time are of worſe Conſequence than at any other.

On this laſt View he will find ſeveral that have ſtraggled from their Poles, or that grow croſly ſince his laſt reducing of them. They are very ſtrong at this Seaſon, and the leaſt Fault encreaſes to a very great one preſently, therefore let him go over them now with redoubled Care. Neither his Hand nor the Stick will now reach them, for they are by this Time grown to a very conſiderable Height; whoever does the Buſineſs muſt be followed by a Labourer with a Ladder, with a Back to it, and this muſt be ſet down againſt every Pole where there is any thing amiſs: every Fault is to be thoroughly rectified, and they are then to be left to themſelves for a Month.

CHAP. X.

Of clearing the Ground and raiſing the Hills.

THIS is a very conſiderable Article in the Care of a Hop Ground, which too many practiſe too ſlightly, and which the beſt Managers I have ſeen do not go through with ſufficient Diligence and Attention; let the Huſbandman who plants upon our Plan regard it more perfectly.

We left the Hops in the laſt Chapter at a good Growth, toward the latter End of MAY, directed rightly in their Courſe along the Poles, and prepared for a beneficial Crop. We are now to proceed to the next Operation, which is that of ſhortening the Plants, but as it is a Month before that is to be performed, it will be proper to conſider the Condition of the Ground, and the Work that is to be done in the mean Time below.

We have ſaid the Earth is to be ſtirred from time to time between the Hills, and the Weeds are to be deſtroyed as they riſe; this is a general Direction, but we are to come to Particulars in this Place. We have frequently ſpoken of the Hills in the Hop Ground, but that Name is given to them in Conſideration of what they are to be, rather than what they are in ſo young a State of the Plantation as that we have hitherto deſcribed; they as yet riſe only two or three Inches above the Level of the reſt, and are only of a ſmall Diameter. We ſee them larger in old Grounds, and we are about to enlarge them in our new one.

Holes were dug for the planting the Hops, theſe were filled with Compoſt for the Reception of their Roots, four of the Sets were planted at the four Corners of each Hole, and the Earth was raiſed two Inches very lightly over their Tops, which were on a Level with the Surface; therefore the Spots where they now ſtand are a little raiſed, and the level Ground between is plain, as the Harrow left it.

In this Condition we ſee it in the Beginning of JUNE, and we then are to begin to give it more the Form and Appearance of a Hop Ground. After the firſt Shower let a Number of Labourers be ſent into the Ground, with an Overſeer of the Work; he is to ſet them to pare off the Surface of the Earth between the Hills, about two Inches deep, himſelf is in the mean Time to be at work at the Hills. He is with a careful Hand to cut away all the ſuperfluous Shoots of Hops, and thoroughly to deſtroy all the Weeds that riſe upon the Hills; this Earth which the Labourers pare from the Surface, is then to be ſhovelled to the adjoining Hills, and carefully laid upon them. In this Manner they will be encreaſed both in Height and Breadth, and the Ground will have more Appearance of what it really is.

We mention the Spade for this Purpoſe, becauſe it will ſuit a moderately large Ground. In a very ſmall one the Handhoe will do; and in a larger the Horſehoe, or Hoe Plow, invented for the Service of the new Huſbandry, is beſt of all. It is much the beſt Method to ſet out with a large Piece of Ground at once, and to prepare it for this Inſtrument by the Diſpoſition of the Hills as we have directed; there is no Article in which it is more largely ſerviceable; nor will any Hop Ground ſucceed ſo well nearly, as one that is ſo managed.

Whichever Method be taken, whether that by the Spade, Handhoe, or Hoe Plow, it is to be conducted in the ſame Manner, the Hills are to be raiſed, with the Earth thrown up, and the Weeds deſtroyed.

This is to be repeated once in three Weeks, during the whole Summer, exactly in the ſame Manner, always taking the Advantage of ſome Rains, for the Earth cuts better, and every thing is more compleatly done at ſuch a Seaſon. This perfectly kills all Weeds, and the Earth added from time to time, keeps the Hills moiſt, and gives Nouriſhment to ſuch new Roots as ſhoot from the upper Part of the Set.

CHAP. XI.

Of ſhortening the Hop Plant.

THIS is a Practice much more eſſential to the Succeſs of the Plantation than many imagine. It depends upon the plain and certain Principle in Vegetation, that in order to promote a Plant's bearing a great Quantity of Fruit, it

it is not to be ſuffered to ſpread too much out into Leaves, or to riſe too much in Height.

We left our Hops at the End of MAY conducted properly along their Poles, and in a Way to take the ſucceeding Part of their Growth to the beſt Advantage.

In this Condition they are to be left to Nature for a full Month, they will be growing in Length all that Time, but at the Period of it they ſhould begin to branch. Many of them will do ſo naturally, but ſuch as do not, muſt be put into the Way of it by Art, and this is to be done by ſhortening the Stalk; that is, by taking off the Top Shoot.

Some prevent the ſhooting farther of the Stem in Length at this Time by turning it from the Pole, and this ſometimes anſwers very well, but it is not ſo certain or ſo ſpeedy a Way as the other.

According to the Directions we have laid down already for the proportioning the Poles to the Plants, we have given a Rule nearly how far in Length each Plant may commodiouſly be allowed to riſe. The Ladder with its Stay is now to be brought into the Ground again, and ſet againſt every Hill; ſuch Plants as have begun to ſpread, are to be left to Nature; for the Branches which are ſhooting out from them will draw the Nouriſhment, and there will not be any abundant Quantity ſent into the Top Shoot. But where it is ſeen that Nature puſhes all her Store this Way, and there is no Appearance of Branches, the Bud or Top of the Shoot is to be pinched off; and this ſtopping its Progreſs that Way, will give all the Sap to new Shoots and Branches. The more of theſe the better; and as they ſeldom grow much till toward the End of JUNE, they are then prevented from being luxuriant by the great Quantity of Sap that is devoted to the Nouriſhment of the Fruit.

This is a very happy Proviſion of Nature in favour of the Planter, but he muſt favour it, and purſue the ſame Courſe; otherwiſe Accidents will interfere and prevent much of the Advantage. Nature ordains that about Midſummer, the Hop Plant ſhall ceaſe ſhooting at length, and begin to branch; and if a rainy Seaſon, or any other Accident tend to interrupt her Courſe, and continue its Growth in length, he is to ſtop it by pinching off the Bud. In the ſame Manner Nature intends that theſe Branches ſhall grow but to a moderate Length, and then fill themſelves with Fruit; but ſometimes a luxuriant Soil, or a croſs Accident of one Kind or other, will prevent this Purpoſe by the ſhooting of theſe Branches into too great a Length. In this Caſe the Planter is to treat them juſt as the main Plant. He is to nip off their end Buds; and as the Seaſon is by this Time far advanced toward the fruiting, Nature will now follow her own Courſe, and turn all her Treaſures thither.

A Plant that would have run thus into a uſeleſs Stem, or when there were Branches formed, would have extended them to a great Length, at the Expence of what was to be of Value, will by this prudent Management be thrown into a proper Courſe, its Stem ſhortened, and the Branches ſtopped in their Growth till every Part be full of Buds for Fruit: this is its full Perfection.

The Planter is now only to obſerve their ripening, in this he is to wait the Courſe of Nature, he can do nothing to aſſiſt her, and he is only to watch that he may take the moſt favourable Opportunity for gathering thoſe Fruits, the free Growth of which he has promoted by his Induſtry and Care.

CHAP. XII.

Of the gathering of Hops.

IT is not without Reaſon we have ſaid, the Planter is to watch his Opportunity of gathering Hops when they are ripe. Care and Attention has been directed throughout every Step of his Buſineſs, and there is no Part in which it can be omitted without Loſs, but there is none wherein the Damage of the ſmalleſt Neglect will be ſo great as here.

The Hops begin to flower about the laſt Week in JULY: in a Fortnight after the firſt Appearance of the Flower, the Fruit begins to form itſelf for Perfection. This is, in the Phraſe of the Planters, called the belling of the Hop, and it is to be expected in the Beginning of AUGUST: from this Time three Weeks, in a good Seaſon, compleatly ripens them. So that the Planter may expect them in condition to gather in very favourable Seaſons, in the End of AUGUST; in middling Times, in the Beginning of SEPTEMBER; and in the worſt, ſoon after the Middle of that Month.

It is needful the Owner watch carefully for this ripening, let him begin the laſt Week in AUGUST to examine them daily, and ſo continue till he find them ripe.

The Marks of their Ripeneſs are theſe. Firſt they change Colour, this is a ſure Token that their Maturity is coming on: after this they begin to ſmell fragrant and ſweet; in a few Days after the Seeds upon Examination will be found turned brown; and ſoon after this the Hop will eaſily fall to Pieces.

Theſe are the four Stages of the Hops ripening; in the firſt and ſecond that Period is comeing on; in the third, it is perfect; that is, when the Hop has changed Colour, the Smell is ſtrong, and the Seeds are brown, it is perfectly ripe; in the fourth Stage it is beginning to fade, for this is the Courſe of Nature: when Things have attained Perfection, the next Step is Decay.

The Progreſs from Perfection to Decay in the Hop is very quick, 'tis therefore we have recommended ſo particular and watchful a Care over it at this Seaſon. When the Owner perceives them to have all the Signs of Ripeneſs, let him get together all the Hands he can for a quick gathering. One Day hanging upon the Plant after they are fully ripe hurts them, and if there ſhould happen a windy Night, as is not uncommon at that Seaſon, he may receive vaſt Damage.

There are too many who gather their Hops irregularly, and by that ſuffer a great deal of

Loſs. The moſt uſual Manner of doing it is this. Begin in the Centre of the Ground: Cut down four Hills that ſtand together, cut the Roots even with the Ground, then lay the four Hills, and the Ground that is between them all level, in the Manner of a Floor: water this, beat it with a Mall, ſuch as they uſe in Turfing, then ſweep it and roll it with a heavy Roller.

This will be a fine level Floor, and is to be the Place on which to pick the Hops. To this Place they are to be brought from all Parts of the Ground, if it be a ſmall one, all being at equal Diſtance from it; but in very large Grounds, another or ſeveral others according to the Extent, are to be made in different Places, but always central to ſome large Quantity of the Ground, for the Convenience of bringing the Hops from every Part to it.

The Hops to be picked are laid on this Floor, and the Pickers are to ſit all round it, and to pick them into Baſkets; the Floor is to be cleaned and ſwept once in three or four Hours, and this Way the Work is continued till all is finiſhed.

The Method in which the Hops are to be taken up is this. Firſt, let the Perſon employed in this Article, go round thoſe he is about to raiſe, with a long Pole in his Hand, with a ſharp Hook at the End of it: let him obſerve where the Tops of thoſe Poles he is about to take up, grow entangled with others, and with this Hook let him cut all theſe gently aſunder. Every Thing is to be done with Care and Caution in the gathering of Hops, and if this ſhould be omitted, the Stalks would pull one another, and ſhake off the Fruit in the removing. When the Plants of the ſeveral Poles he is about to remove are thus cleared, he is to cut them off at the Bottom.

It is a common Cuſtom to cut them near the Ground, but this is a very great Error. The Hop is in a Condition of great Strength at this Seaſon, vaſt Quantities of Sap have riſen for the filling of the Fruit, and they continue riſing ſtill; ſo that in cutting the Plant off near the Ground, a Wound is made that does not eaſily heal, and that bleeds a great deal to the weakening of the Root.

The proper Method is to cut them off at a Yard from the Root, and they muſt be taken up only as they are wanted, proportioning the Quantity taken up at a Time to the Number of Perſons employed in picking.

As many Plants ſhould be cut off at once as will find them Employment a Quarter of a Day, 'tis hazardous to venture cutting up any more, for either a hot Sun, or a Shower of Rain will do a great deal of Harm to thoſe which are cut.

When the Plants are looſened from their Intanglings at Top, and cut off at Bottom, all is not done. They are not to be unwound from the Poles, for they twiſt themſelves too cloſely, and too irregularly about them for that; the Poles are to be taken up, and the Hops picked off as the Plants are on them.

The Method is to raiſe them out of the Ground. Some do this by Hand, rocking them about, and then pulling them up; but we have adviſed them to be too well faſtened for that. Poles thus eaſily taken up, are but in a bad State to ſecure them againſt the Wind.

The Planter ſhould have a large Pair of Knippers, or ſome other Contrivance for this Purpoſe, and a Block of Wood to lay near the Pole, that while the opening of the Knippers takes hold, their Handles may have the Effect of a Lever. Theſe Knippers may be of Wood or Iron, the latter is more expenſive, but vaſtly the better. Theſe ſhould be made with very long and ſtrong Handles, and ſhould open like a Smith's Tongs, but be well toothed on the Inſide.

When they are to be uſed it is thus. Firſt rock the Pole about with the Hand; then lay the Block of Wood near it: then the Points of the Knippers are to be thruſt into the Ground open, to take in the Pole, and the Handles to reſt upon the Block. When they are cloſed, and have good hold, the Pole is to be raiſed out of the Ground by bearing againſt the Block.

The wooden Inſtrument for this Purpoſe muſt be a large, long, and ſtrong Lever, ſplit and kept open at the End. There muſt be Iron Teeth in this open Part, and it is to be uſed exactly as in the former Direction.

We have obſerved that the Hop Poles ſhould have a Fork at the End for the better keeping the Top of the Plant, but for the common Way of picking upon the Floor, it is beſt they ſhould not, becauſe they come the eaſier off when the End is ſingle.

In the picking of Hops great Care muſt be taken that it be done clean, if there be any Fragments of Stalks left among them they diminiſh their Value. The little theſe Foulneſſes add to the Weight, is of no Conſideration compared with the Reduction they occaſion in the Price.

We have given very punctual Directions for judging of the Ripeneſs of the Hop, as that is an Article of great Conſideration; but we are not to omit obſerving that there is a Diſpute among the Planters at what exact Degree of Ripeneſs it is moſt profitable to gather them.

We ſhall give the Facts as they appear upon Trial, for there is no other Way of judging. When the Hops are but moderately ripe, they are of a better Colour, and they preſerve it when dry, and at the ſame Time they are ſure to retain all their Seeds, in which their greateſt Virtue lies: this has led many away at once to the reſolving to gather them in this State. The Advantages are very certain, and very apparent; but let us examine the other Side of the Queſtion.

It is true that the Hop does not dry to ſo fine a Colour when very full ripe, and that it naturally drops ſome of the Seeds; but on the other Hand, the full ripe Hop has its full Subſtance, which the other has not: and as it is leſs watery, it does not loſe ſo much Weight in drying. Five Pounds of moderately ripe Hops yield a Pound dry, and four Pound of full ripe ones do the ſame. Therefore tho' the others bring a large Price at Market, yet unleſs it be larger by that Difference, the Advantage will be

be in letting the Hop ſtand to its full Ripeneſs.

This is the exact Fact on either Side, we have no more to do than to propoſe it: the Planter may now take his Choice of the two Methods.

CHAP. XIII.

Of the drying of Hops.

WE have led the young Planter through the whole Courſe of his Undertaking in a Hop Ground: from the preparing the Land, to gathering the Fruits of his Labour. His Hops are picked and he is to dry them. This is to be done by a Kiln erected for that Purpoſe, but we are to caution him in the firſt Place to be very quick in doing it. No Time is to be loſt in the picking after the Hops are cut up; and when they are picked no Time is to be loſt in drying them. Their lying but a little while together after they are picked heats them, and the firſt Effect of this is the Loſs of their Colour, the next is the Loſs of their Smell. Few let them lie long enough to incur the laſt Damage, but the former is too frequent, and it is not to be remedied.

It may happen that the Kiln is full when a great many are picked and ready for drying. This is to be avoided as carefully as poſſible, by proportioning one Part of the Work to another; but if it happen unavoidably, the Method is to ſpread them very thin upon the Floor of ſome covered Place where there is a thorough Air, that what drying they thus get naturally may be regular.

A ſmall Quantity of Hops will dry compleatly thus; and a larger will get no Damage in lying a Day or two; and it muſt be very bad Management indeed if the Kiln is not by that Time ready for them.

Nothing is ſo eaſily damaged as the Hop in drying: and all the Care beſtowed in the raiſing of it is thus rendered ineffectual; for the Price is reduced at Market, and the Value alſo for Home Conſumption; the Merit of the Hop is its perfect Fragrance and fine Colour, and theſe can never be preſerved but by the moſt careful Manner of curing.

Let the Planter be cautious not only that his Hops be dried well, but that they be all dried alike; and if it happen that one Parcel differ from the reſt, in this Reſpect let him keep them ſeparate; for one Pound of ill dried Hops, mixed with fifty of the beſt preſerved that can be, will deſtroy the true and rich Smell of the whole.

Having delivered the Cautions in this Reſpect, we ſhall now lay down the Manner of doing it.

It is a common Practice in ſome of our Hop Countries, to dry them in a Malt Kiln, upon a Hair Cloth ſtretched out for that Service. In FLANDERS they build a Kind of Kiln on Purpoſe; and in ſome other Places they alter the Malt Kiln for this Uſe: we ſhall give the Planter his Choice of theſe ſeveral Ways, but not without pointing out to him which deſerves the Preference.

CHAP. XIV.

The FLEMISH *Manner of drying Hops.*

THE Method uſed by theſe Planters is to build a Kiln of Brick; which is a Room of about ten Foot wide: the Door of this Room is made on one Side, and the Fire Place is in the Center, and for a Room of ten Foot, it is fifteen Inches wide in the Clear, and ſo many deep, and its Length muſt be within five Foot that of the Room; it is to run all along the Middle, and to terminate two Foot and a half from each End, that the Perſon who has the Care of the Work may go round it: or it may be free only at one End for a Paſſage, and be made in the Manner of the Fire Place of our common Malt Kilns, the Fire paſſing out at Holes on each Side.

This Fire Place muſt be made on the Floor: and four Foot above the Top of it is to be made the Bed, whereon the Hops are to lie. This muſt have a Wall of three or four Foot high round about it, to keep them from falling off.

Adjoining to the Kiln there muſt be a Room into which the Hops are to be put when dry; and a Window is to open out of the Place where the Bed is, into this Room, that they may be ſhovelled through without Trouble.

The beſt Floor for the Bed is made of a Kind of Rails like our Pantile Laths, they are to be an Inch ſquare, perfectly well planed, and they are to be placed a Quarter of an Inch aſunder, that the Heat may freely paſs through, and the ſmalleſt Hop not fall out. There generally runs a Beam croſs the Bed in the Middle, and the Rails are all let into that even with its Top.

When this Kiln is prepared the Hops are to be thrown in as they are picked, one Baſketful after another, till the whole Bed is full, and they lie a Foot and half deep upon it. They muſt be let to lie as they fall, and not preſſed down any Way: it will be proper to draw a wooden Rake over the Surface, that they may not lie thicker in one Place than another; but this muſt be done lightly.

When the Hops are in and thus ſtroaked even, the Fire is to be kindled. In FLANDERS they burn dry Wood, and that often but of an indifferent Kind; but it is much more proper to uſe Charcoal, which we would adviſe the Planter to burn himſelf, with a particular Care, for that Purpoſe.

The FLEMISH Hops are commonly cenſured for having an ill Smell; and this is owing entirely to the Practice of burning Wood under them. Let the clean Fuel we have directed be uſed, and that Fault will be perfectly avoided.

The Fire muſt be a pretty good one, but it is not to be continued all along the Fire Place, it muſt be only at the Mouth of the Furnace; for being well kept up there, the Air which paſſes through will convey the Heat to every Part of the Kiln.

This Fire is to be continued till they are thoroughly

roughly dry, but this muſt be carefully regarded, for they ſometimes do not dry equally.

The Way to try whether they are dry enough is to examine them at Top; if they are thoroughly dry there they will rattle on drawing a Stick over them; and if they are thus dry in ſome Places, and leſs in others, they muſt be thinned where they are dampeſt, throwing what are taken off upon the dryeſt Places: thus the Fire being continued they will ſoon be all finiſhed.

This is the only ſtirring the Hops are to have when dried thus: but the great Care is to keep an equal Quantity of Fire all the Time, that there may be throughout an even Heat. When they all appear to be thoroughly dry by their Colour, Aſpect, and Rattling, they are to be tried by breaking the inner Stalk, if that ſnap freely they are dry as they ſhould be; and this is a certain Rule, for till they are that Stalk never is rightly brittle.

If they are not found to be perfectly cured, the Fire is to be continued a little longer: if they be finiſhed it is to be let out, and the Hops are to be ſhovelled out at the Window, into the Room prepared for receiving them. After this the Floor of the Kiln below is to be ſwept, and what Seeds and broken Hops have fall through the Railing, muſt be got together and put to the reſt. Then a freſh Quantity of Hops are to be put in, the Fire is to be lighted, and the whole Procedure is to be repeated exactly in the ſame Manner as before.

CHAP. XV.

The Way of drying Hops in a Malt Kiln.

THIS is a Method of drying them, which comes much eaſier than the other, where there is a Malt Kiln in readineſs, becauſe the Fire Place there is made to ſerve, and the Trouble and Expence of a particular Building is ſaved.

We ſhall not, in this Place, deſcribe the Structure of a common Malt Kiln, that is ſufficiently known; and we ſhall alſo have Occaſion to ſpeak of it particularly hereafter in its Place. The Manner of employing it for the drying of Hops is this: a Hair Cloth is to be uſed as a Bed for the Hops, and they are to be ſpread upon it ſix Inches thick.

They are thus kept over the Fire made in the uſual Way, till they are about half dry; then they are turned with a Scoop made for that Purpoſe, the lower Part upwards, and the upper Part, which was leaſt done, loweſt; thus they are to lie till the whole Quantity is thoroughly dried.

When they are done the Hair Cloth is removed, and they are thrown into a Room; where they lie ready for bagging. This is the Method of drying Hops at the Malt Kiln; in Favour of which nothing can be ſaid, but that for ſmall Quantities, where there is a Malt Kiln near, it may be convenient to ſave the Expence of a Building erected on Purpoſe.

The Hop Branch however is ſo profitable, that we ſhall adviſe the Farmer to ſet out in it boldly, taking a large Ground, and not ſparing the firſt Expence in any needful Preparations. So that this Expedient will be of little Service to him, wherefore we have treated of it more ſhortly.

For thoſe who find it proper, according to their particular Occaſions, this Caution is to be given them, that they take great Care in the turning, to do it gently; and that they uſe clean Fuel; and keep the Heat uniform and equal during the whole Time.

CHAP. XVI.

Of drying Hops in a Malt Kiln fitted to the Purpoſe.

WE have ſhewn the univerſal Flemish Way of drying Hops; and that Method of doing it in England by the Malt Kiln and Hair Cloth; both are uſed, and may anſwer, but we are here about to propoſe a better Method, which is by preparing a Malt Kiln for that Purpoſe: and before we enter on its Advantages it may be proper to ſhew the Inconveniences of the others.

As to the Flemish Way the Fire muſt be continued longer than in any other, becauſe there is ſo large a Body of Hops to dry; and as they are never turned, the under ones muſt be more done than the upper, and muſt be over-done in the drying the upper ones ſufficiently: therefore there is more Time, more Charge in watching, and more Fuel than need be; and the greater Part of the Hops are too much dried, by which they loſe both Weight and Colour, ſo that they are doubly the worſe, while the Expence is greater.

In the Way by the Malt Kiln and Hair Cloth, the Neceſſity of turning is a great Trouble and Inconvenience, for many of the Hops are ſhattered and broken, to which not only the Motion of turning, but the Roughneſs of the Hair Cloth contributes; and a great deal of the Seed is ſcattered and loſt by the Motion. Perhaps theſe are leſs Inconveniences than thoſe in the Flemish Way, but they are very great ones notwithſtanding. We have ſaid before, that a great deal of the Virtue of the Hop is in the Seed, therefore this is a great Damage; and the breaking the Hop always injures the Price at Market.

We ſee the Inconveniences of theſe ſeveral Methods, therefore let us conſider whether they cannot be guarded againſt; and whether a Way of drying may not be found, which ſhall have all the Advantages attending this Method, without the Damage of either.

This is what we ſhall attempt in the Method which we are about to recommend: it has been practiſed in ſome Places many Years, and the Advantages of it are ſo great that 'tis pity it ſhould not be univerſal. To this Purpoſe let there be a Kiln, the lower Part of which ſhall be, in all Reſpects, the ſame with that of a common Malt Kiln; therefore a common Malt Kiln may be uſed for this Purpoſe, with the following Additions, or there may be one purpoſely erected in the ſame Manner.

When the Kiln is thus far prepared, the Bed for the Hops is to be thus made. Frame toge-

ther a Quantity of Slips of Deal well planed, let them be three Inches broad, one Inch thick, and of ſuch Length as ſuits the Kiln, and the Quantity. Let theſe be laid Checkerwiſe one over another, at four Inches diſtance; let thoſe which lie uppermoſt be let into the lower, and the whole Surface kept ſmooth and perfectly even. This Frame muſt be ſupported by Joiſts ſet Edgewiſe, and ſo placed as to lie in a true Level.

Then prepare a Covering for it, of that ſtrong Kind of Tin called double Tin; let the Meaſure be carefully taken, and the Plates of Tin well ſoldered together, and let the laying of the ſeveral Plates be ſo contrived, that the Joints fall upon the Middle of the Ledges.

When the Frame is well tinned let there be four Sides of Boards made to it. Three of theſe are to be fixed, but the fourth muſt have Hinges: it is to be hooked up in the Time of uſing; but when the Hops are dried and are to be removed, it is to be let down, ſo that they can be puſhed gently off without breaking.

When the Bed is finiſhed let there be a Cover prepared for it. This muſt be exactly of the ſame Length and Breadth, it muſt be made of Boards, and framed together; the lighter the better, ſo it will be able to ſupport its Extent. The Face of this muſt be covered with Tin Plates, laid on evenly, which will be very eaſy, the Boards being planed.

This Cover is to be hung flat from the Roof of the Kiln, at a conſiderable Height above the Bed, but ſo contrived that it may be let lower upon Occaſion, in the Time when it is wanted. The Bed being thus prepared, and its Cover hung over it, Conveyances for the Smoak muſt be made at the Sides and Corners of the Kiln, and then the whole is ready.

Some Expence there is in fitting up this Kind of Kiln at firſt, but it very richly anſwers. Leſs Time and leſs Fire are required, and almoſt any Kind of Fuel will ſerve.

We have obſerved that in the FLEMISH Way there is a great Error, in uſing raw Wood or any other foul Fuel, but in this Method that Caution is not neceſſary. Then the Smoak or Vapour of the Fuel lodges among the Hops as they are drying, becauſe the Bottom of the Bed is open; but here, as that is covered with Tin, the Vapour never gets among the Hops at all.

We have ſhewn the Conſtruction of this Kiln, we ſhall now proceed to the Manner of uſing it. We ſuppoſe a Parcel of Hops picked and ready for drying, let them be carefully emptied into this Bed by Baſketfuls, and ſpread a little about by the gentle Motion of a Stick, in the Hand of a Perſon who can go along the Sides of the Bed, and from one Part or other reach over it; the Hops are thus to be ſpread about till the Bottom of the Bed is covered eight Inches deep with them pretty evenly; this done the Fire is to be lighted and kept up equally, till the lower Part are dry, and the greateſt Quantity of the Moiſture is evaporated from the whole.

Then let the Cover be gently let down till it comes within ten Inches of the Surface of the Hops, the Fire being all this Time continued as at firſt; the Effect of this Cover will be like the Dome of a reverberatory Furnace, it will reflect back the Heat of the Fire upon the Hops, in ſuch Manner that the top Part ſhall ſoon be as dry as the Bottom.

When all are dry enough the hinged Side is to be let down, and being ſupported ſlanting downwards with a gentle Deſcent from the Level of the Bed, the Hops are to be puſhed out carefully with a Board at the End of a Pole, and the Side being put up again all is to be continued in the ſame Manner, with a freſh Parcel of Hops.

To ſave the Expence of this Cover, a flat Scoop may be uſed to turn the Hops when they are two thirds done, but this is ſome Labour, and all Motion, as we have ſhewn, hurts the Hops; the Expence of the Cover need not be any thing like that of the Bed, for rough Boards will ſerve, and common Tin Plates nailed on will perfectly well ſerve for the facing of it. In this Manner the Price is moderate, but if it were much more it would be eaſily ſaved in a little Time, in the Advantage the Hops get by drying without turning.

CHAP. XVII.

Of the bagging of Hops.

OUR young Planter ſhall not be left at a Loſs in any Part of his Buſineſs, he has ſeen the Hop raiſed, picked, and dried, which laſt is the moſt nice and moſt expenſive Article of all; and we ſhall proceed now to the packing them up in Bags, after which they are out of his Hands.

We have directed that when Hops are to be dried, a Room is to be prepared for receiving them from the Kiln. This muſt be dry and airy, and there requires no farther Care.

The Hop being kept whole and clean, is a great Article in its Value: for this Reaſon, as well as many others, it is not to be packed up directly from the Kiln, for it is then very brittle, and would break in ſuch a Manner as to foul one another, and be full of Fragments. This would greatly reduce their Price. Beſide, they would have too much Heat among them, and this not going off freely would damage them. For this Reaſon they muſt lie in this Room till they have thoroughly cooled; and they will, in that Time, grow ſo tough and firm that they may be preſſed in packing without Fear of hurting them.

Three Weeks is the leaſt Time they ſhould lie for this Purpoſe, and according to the Seaſon, and other Accidents, it will be proper ſometimes to allow them a Month or longer.

If the Weather be moderate they will come to a proper Toughneſs very well, lying open; but if it be very hot and dry 'tis beſt to ſpread Blankets over them. So tender a Thing as the Hop very well perceives the Difference of Seaſons within Doors.

The Room into which the Hops are received from the Bed of the Kiln, ſhould be pretty near the ſame Level with the Bottom of the Bed, that the Hops may not be hurt by falling too far:

this alſo anſwers another Purpoſe in the bagging; for being at this Height there may be another Room under it, which is quite neceſſary for the managing that Matter.

In the Middle of the Floor of the Room into which the Hops are received from the Kiln, there muſt be opened a Hole communicating with the Room underneath. This muſt be four Foot long, and three and an half wide. The Bag into which the Hops are to be received muſt have a Hoop faſtened to its Top, the Edge all the Way round being turned over the Hoop, and faſtened with Packthread in a large Needle. This Hoop is to be of ſuch a Size that it cannot go through the Hole.

The Bag being thus prepared is to be let thro' the Hole, the Hoop ſupporting its Top remaining above; and this is to be very well faſtened in, becauſe it is to bear all the Weight and Force in the treading.

The Bag being let through, toſs in a ſmall Quantity of Hops, and then going into the lower Room, gather up ſome of them to the Corners, and tye in a ſmall Parcel into each Corner, with a Packthread put ſtrongly round. Theſe reſemble Toſſels or Pincuſhions, and are very ſerviceable afterwards in managing the Hops.

When this is done let more Hops be thrown in, and let the Man who packs get into the Bag, diſperſing them evenly, and treading them down as faſt as they are thrown in: this is to be done till the Bag is full.

When this is done the Bag is to be unripped from the Hoop, and its Top ſowed firmly together, making a couple of little Bunches at the Corners, as there were at the Bottom. This finiſhes the Management of the Hop; for in theſe Bags they are ready for the Market, and if the Owner have a Mind to wait for a more favourable Time for ſelling them, they will keep ever ſo long in a dry Room without Damage.

CHAP. XVIII.

Of the Management of the Hop Ground after the Hops are gathered.

WE have ſet out with ſuppoſing our Planter to begin his Work from the Ground, and have carried him through the firſt Seaſon. We have therefore yet given few Directions for the managing an old Hop Ground, our Subject haveing been a new one. We ſhall here enter upon the Care of the Ground after the Crop is gathered, and this will lead us to that Conduct which is neceſſary in Plantations that have been ſometime eſtabliſhed.

As ſoon as the picking is over clean off the Stems of the Hops from the Poles, and lay them up dry for another Year, the beſt Way is to place them in a Heap under ſome Shed. In large Grounds 'tis worth while to erect a Shed for the Seaſon of picking, that this may be done under Cover; and the ſame Building will ſerve for keeping the Poles till Spring. Some raiſe them in Heaps hollow within, and ſtanding like a Pyramid, but the Outſide Poles are damaged in this Way, and the Tops of all. Others lay them in Heaps expoſed, only ſpreading the dry Plants over them, but this rots them. The Method of houſing them is much better; and the Poles come ſo dear, and the Shed may be raiſed for ſo little, that 'tis worth while to do it only for that Purpoſe.

As to the Hop Ground, that is to be left untouched till Spring: but it will be needful to give it a good Dreſſing then, and therefore the Manure ſhould be got ready during the dead Seaſon. As the Planter uſed a Compoſt for the receiving his Sets at firſt, ſo he is to follow the ſame Method in dreſſing the Ground afterwards. Then let him be ſure to remember, on all Occaſions, Hops will be very much improved by Dung; but they cannot bear ſuch as is new: it will utterly deſtroy them. Upon the proper Condition of this Manure, and the due dreſſing of the Ground by Tillage, will depend the Succeſs of the next Year.

It is in the Planter's Choice to have a moderate Crop, or three Times as much, according to his Diligence and Conduct; and it is poſſible, by Neglect or Miſmanagement, not to have a third Part of what would naturally come.

Mix ten Load of Dung, that is at leaſt a Year old, with two Load of common Garden Mould; and half a Load of ſharp Sand, ſtir and work all this thoroughly together about November, and let it lie till Spring.

The laſt Week in March plow the Ground lightly over, then bring out all the old Haulm or dry Stems of the Hops that were taken off the Poles the laſt Autumn, lay it in Heaps in different Parts of the Ground, and let Labourers ſhovel ſome of the Surface of the Ground upon the Heaps. Then ſet them on Fire and reduce them to Aſhes. Theſe Aſhes will lie in Heaps, and let the Compoſt laid together in November, be brought into the Ground, and equal Quantities of it laid on every Heap. Let a Labourer mix the Earth and Aſhes with the Compoſt, and this becomes an extreamly rich Manure, and agrees perfectly well with the Hop, though a difficult Plant.

As ſoon as this Mixture is prepared, which will probably be within the Week, or in the very Beginning of April, let the Hills be opened, and they are to be refreſhed with it.

Let it not appear ſtrange to the Planter, that we adviſe the ſetting about dreſſing the Ground ſo late as in the Beginning of April. We are ſenſible it is the Cuſtom of many to do it earlier, but Experience has ſhewn us this Time is much better. The Hop is a Plant that ſhoots late, and 'tis happy for the Planter that it does; for when a forward Spring brings the Shoots early, there generally happen ſome Injuries to them. This late dreſſing keeps them backward in ſpringing, and at the ſame Time thoroughly deſtroying the Weeds ſo late, they do not riſe of a conſiderable Time.

Theſe are the Reaſons for late dreſſing the Hop Ground: the Manner of doing it is this. The Hills are to be one after another pulled down, and the Roots examined. Theſe are of two Kinds, the old and the new; the old are all to be preſerved, and the new, which ſhoot Sideways

are

are to be cut away. The old Roots are reddiſh, and the new are white, ſo that the Colour eaſily diſtinguiſhes them.

But let the Planter remember that it is not all the new Roots which are to be cut off, but thoſe only which ſhoot ſideways. Such as run downwards are to be preſerved.

The ſame Diſcretion is to be uſed with the Shoots, the old Sets are to be preſerved, and here and there a good young one that is well placed, is to be left on with them, the reſt are to be taken off; they are ready for planting in new Ground if wanted, if not let them be thrown away.

When the Roots and Sets are thus cleared and prepared, let the Earth that was taken from them, and that removed by the breaking of the Hills, be thrown into the Spaces between the Hills; and let the Hills be made up to a due Height, with the mixed Compoſt and Aſhes, and calcined Earth, which together makes an excellent Manure. The young Shoots are to be cut off at an Inch from the old one this firſt Dreſſing, but every Year afterwards they muſt be cut away cloſe.

It will often happen that the Set of a good Hop degenerates into a wild Kind; in this Caſe let the Hill where this ſtood be marked at the Time of gathering; and at this Spring dreſſing let it be entirely taken to pieces, the former Sets removed, and ſome of the beſt of thoſe produced by the good Kinds be planted in their Place. The Hills muſt not be made too high at firſt, becauſe the Ground is to be pared in the Summer, as directed before, and theſe Parings are to be laid upon the Hills; ſo that if they were too high at firſt they could not bear this Addition, the Uſe of which we have ſhewn already.

As we have adviſed the dreſſing the Ground ſo late, the new Planter may be ſtartled to find ſome of his Hops up when he ſets about it: he is not to regard this, but to go on with his Work. The cutting off a Top at this Seaſon does no Harm: but this being once done, and the Hills made, let him take Care no Injury is done to them afterwards. All Vermin and all Poultry are to be kept off, and of all Birds he is to be the moſt aware of the Gooſe, the greateſt of all Enemies.

CHAP. XIX.

Of dreſſing an old Hop Ground.

THE Hop Plant comes to its full Vigour the third Year, and it will laſt a great while; but Time will wear out the Strength and Heart; and ſometimes Neglect will bring the Ground in a few Years to the Condition it would have fallen into neceſſarily after its full Period.

In either of theſe Caſes the ſame Method is to be followed. In this Circumſtance the dreſſing of the Ground muſt be begun in Winter, not ſtaying till Spring. Firſt let the whole Space between the Hills be plowed up with a four coultered Plow, that it may be cut deep and thoroughly broken: and let there be in readineſs ſome of the Compoſt before deſcribed. When the Spaces are thus broken up, let the Hills themſelves be pulled down as far as can be with Safety to the Plants, and let their Earth, and ſome of that which is neareſt them in the Spaces, be thrown to a Diſtance, and bring in the Compoſt to ſupply its Place all about them.

This deep plowing will deſtroy the Weeds perfectly, and the Addition of new Stuff will give the Hops the Advantage ſo far, of not only new Ground, but very rich Ground.

There is alſo another Advantage in this Method, which may be underſtood by the Principles of Huſbandry before laid down; this is, that the Hop is at once encouraged to ſend out new Roots, and Nouriſhment is provided for them.

To explain this perfectly, let us ſet before the Reader the real State of a decayed Hop Ground, as it would appear if the whole were expoſed to the Eye.

Here are a Number of Hills with ſtrong old Plants upon them, and here is a great Extent of Ground between and about them, which is hard and firm, at leaſt it is ſo at a little Depth.

The Surface of this Ground may have been ſtirred to four, five, or ſix Inches deep, but never more ſince the Ground was made: under that it is perfectly hard, as if never broken by any Tillage.

The Roots of the Hops we have ſhewn do not ſpread near the Surface, nor ſhould be ſuffered much to do ſo. Their common Way is to ſtrike deep into the Earth, and there to ſpread every Way to a great Diſtance. This is their natural Courſe, and in this they ſhould be encouraged; now let us conſider what is the Caſe of an old Hop Ground. The Roots have gone their Depth, and they cannot ſpread becauſe of the Hardneſs of the Ground between. The Earth in the Hills is all they have any Advantage from, and that in general is renewed too ſuperficially.

In this Caſe the Hop ſends its Roots but a little Way, and they lie in an Earth they have long before exhauſted. This is the Occaſion of their Decay. We ſee that by removing them into a new Ground, the ſame Plants ſucceed greatly, Nature therefore is not exhauſted in them. We have ſhewn how they come to loſe their Vigour: and we have ſaid at firſt, that at ſuch Time the common Practice is to ſet them in a freſh Ground, that in which they ſtand being worn out.

We have ſet this plain State of the Caſe before the Planter, to ſhew him that this is the Occaſion of the wearing out of the Ground; and as we are about to propoſe the renewing it by Tillage inſtead of giving it up, we ſhall ſhew the Reaſons.

We have delivered the Caution of planting the Ground with Fruit Trees in Time: ſo that the Perſon who chuſes to give up his Ground at the End of ten or a dozen Years, may do it to the beſt Advantage: but we here ſhall give him the Choice of reſtoring it to its Vigour, and continuing it in Strength from Generation to Generation.

CHAP.

CHAP. XX.

Of reſtoring a decayed Hop Ground.

IN the Condition wherein we have deſcribed the Hop Ground, the common Practice is to give it up; and this was very reaſonable upon the old footing of Agriculture, in which nothing was known but by Memory; Men practiſing what they had ſeen done before, and underſtanding nothing of what they did by Method. Now we are upon a new and better Syſtem.

On taking up a Root of an old Hop Plant in one of theſe decayed Grounds, the Fibres hanging from it will be found few in Number, large, and often mouldy, or otherwiſe decayed at their Ends. This is a State in which they can ſupport the Plant but very poorly. The large Roots in all Growths ſerve to receive the Nouriſhment from the ſmall ones, and convey it to the reſt of the Plant; but 'tis the ſmall ones that abſorb it from the Earth. There are few of theſe, therefore the others in a Manner loſe their Uſe, and the Plant is very poorly nouriſhed. There are no ſmall Roots to penetrate into the Ground, nor any Ground in a Condition to receive or ſupply them with Nouriſhment. Therefore to reſtore the Hop Ground to its old Vigour we muſt do two Things, and no more are neceſſary; we muſt occaſion the Plants to ſend out more Roots, and prepare the Land to give them free Paſſage, and afford them Nouriſhment.

How we ſhall go about to make the Plants ſend out new Roots, the common Practice of every Gardener ſhews us. When he is to remove a Plant of whatever Kind, he cuts off the Ends of all the Roots before he ſets it in the new Ground. The Effect of this is, that there immediately ſtrike out a great many new ones; and theſe being ſmall are in a Condition to imbibe Nouriſhment.

The other Article may be learnt alſo by the ſame familiar Example. When the Gardener has cut off the Ends of the Roots, he opens a Hole and ſtirs up the Ground about the Place. This diſpoſes the Mould to give free Paſſage to theſe new Roots, and to afford them Nouriſhment.

Now let us apply the Principles we have before delivered, and this familiar Example to practiſe in the reſtoring a decayed Hop Ground.

We ſay the Earth is exhauſted, but that is a Miſtake. The greater Part of it, that is, all in the middle Parts of the Intervals, lies hard and unpenetrated, and has done ſo for many Years, no Roots have got into this at any Depth, therefore this is not exhauſted. Now the Earth about the Hills being exhauſted, is to be removed, and freſh and better Matter to be put in its Place, and the other being thoroughly broken and divided by the four coultered Plow, will be ready to ſerve as new Earth in all Reſpects.

In plowing the Ground let the Plow come as near to the Hills as it can, and cut to the full two Spit Depth, particularly in thoſe Places. This will cut off the Ends of all thoſe Roots which ſhall have penetrated ſo far within that Depth, and the Ground being rendered light and fine by the breaking, will be ready to receive freely the new ſmall Roots they ſhall ſhoot from their Ends, and to afford them Nouriſhment. In the ſame Manner the Spade will, in digging down the Hills, cut off the decayed Ends of thoſe ſhorter Roots which never extended beyond the Hill; and not only a well broken Earth, but a perfectly new Earth will be added here for them to ſtrike into, and for the ſupplying them with Nouriſhment.

Thus by this double Management of the Hills and the Spaces, the Roots will be nearly all cut off at their Ends; they will be put in a Condition to ſend out new ones, and there will be Earth all about them to receive and ſupply them with Nouriſhment; and this is all that is required for the moſt perfect Growth of every Plant.

We ſee therefore in Reaſon, that a Ground thus treated ought to yield as well, and indeed better than a new one, becauſe of the eſtabliſhed Growth of the Sets: and I may almoſt venture to affirm, that it will anſwer exactly ſo in Practice. What I am propoſing to others I have tried myſelf in little; and am now practiſing at large. I mended one Corner of my Ground in this Way, and it anſwered to the utmoſt Expectation: I am now trying the ſame Courſe in the whole Ground, and have no Reaſon to doubt but the Succeſs will every where be equal.

When the Ground is thus run to Decay no Method is ſo good as uſing the four coultered Plow, becauſe of the Depth to which it cuts, and the perfect Manner wherein it breaks the Furrow: but when the Ground is once reſtored this Way, the common Horſehoe or Hoe Plow, called the Horſe-Break, is fully ſufficient. This is a new Practice, but it is founded on Reaſon, and ſupported by Experience in other Growths, nor can there be the leaſt Doubt of its full and entire Succeſs, according to the Promiſe of the Trial I am now making.

CHAP. XXI.

Of watering a Hop Ground.

THERE remain yet ſome few Particulars to be mentioned, as to the Management of a Hop Ground; and theſe as they are not general, and at all Times neceſſary, we have referred to this ſubſequent Place of Conſideration, that we might not break the Chain of neceſſary Works in every Ground, and for every Seaſon.

The Principal of theſe accidental Articles is watering. It is not neceſſary every Year; and happy for the Planter that it is not, for 'tis a Buſineſs of great Fatigue; but ſometimes, whatever be the Expence or Labour, it will be found worth while to do it.

This depends upon the Seaſons, When Nature follows her uſual Courſe the Planter muſt give himſelf no Trouble to aſſiſt her; but he is to know what Aſſiſtance ſhe ſhould afford, and when that is wanting he is to aſſiſt her by Art.

Thus Spring is a Seaſon in which there are

Showers,

Showers, Nature intends this, and all Vegetables require it: but there are Seaſons in which the Courſe of Nature is prevented, interrupted, or ſtopped: in theſe let the Planter in the Hop Buſineſs aſſiſt her at whatſoever Expence.

No Plant requires the Spring Rains more than the Hop: ſome will do without them for the Time, and recover afterwards when Rains fall, if ever ſo late; but if the Hop be defrauded of its due Watering in Spring, it will be ſeen in the Fruit in Autumn. The Planter being informed of this, will know it his Intereſt to give the Aſſiſtance Nature chances to withhold.

We have for this Reaſon obſerved, that in the Choice of a Piece of Ground for Hops, the Planter ſhould, if poſſible, fix upon a Place where there is Water near.

The Time of watering Hops is a material Conſideration. We have obſerved that it is not to the Advantage of the Hop to ſhoot early, becauſe the Plant is by that thrown in the Way of many Accidents: therefore the Time of watering is not early, becauſe Water will promote their Shooting.

The firſt Seaſon is juſt before the Ground is pared, and the Hills made up. This will diſpoſe the Hops to ſhoot vigorouſly juſt when it ſhould; that is, juſt when the Hills are in a Condition beſt to ſupport their Growth.

If the Seaſon prove tolerably favourable, the Trouble of watering concludes at this once; but if no Rains fall in the following Month, it muſt be repeated at the End of that Time; and if the enſuing Summer continue dry, it may be repeated once more about the Time of the Hops flowering, with great Advantage. Nothing contributes to fill and perfect the Hop ſo much as a proper Degree of Moiſture at the right Seaſons,

In the watering the Hop Ground, a ſufficient Quantity is to be allowed: to do it ſlightly is not to do it at all, the Planter throws away his Expence, becauſe he grudges to do what is ſufficient: the Hop is a large Plant, and great Supplies both of Water and Earth are to be given it, or it will never be able to ſupport itſelf to any Advantage.

Every Time the Ground is watered, let the Spaces be pared afreſh, and the Parings added to the Hills; this keeps in the Moiſture, and defends the Roots and Stems towards the Bottom, where they are moſt capable of Injury from the great parching Heat of the Sun. The Vapour of this Water alſo aſcending through theſe Parings, mellows and ſoftens them, ſo that they become an excellent Manure as well as Shelter; and the Weeds are deſtroyed by the ſame Operation: ſo that in this Article thus conducted, nothing leſs is done than this; the Hop Roots are refreſhed, the Land is not exhauſted by Weeds, and it is given to the Plants in the beſt poſſible Condition for their Support.

Sometimes particular Plants of the Hop will ſucceed but poorly, or ſingle Hills will dwindle when the reſt of the Ground is flouriſhing enough: in this Caſe as the Diſorder is particular, a particular Remedy is to be applied.

Let theſe Hills be watered frequently with Water in which Pigeons Dung is mixed; making a Baſon round the Plants, that none of the rich Water may be loſt. If this does not ſucceed, let the Hills be carefully opened, and let ſome Hogs Dung mixed with ſome rich Earth, be put in about the Roots.

About NOVEMRER let the Ground be particularly well dug, and broke round theſe Hills, and they will by this Management equal, if not exceed the beſt of the others.

Having thus laid down the Method of managing the Hop Ground from the Beginning to the End of the Work, we ſhall communicate to the Publick certain Improvements upon the common Practice made by others. They have fallen into our Hands in the Form of Letters, from various Perſons, in Conſequence of thoſe Advertiſements, wherein at the firſt ſetting out of this Work, are requeſted the Aſſiſtance of all who had practical Knowledge, and had Generoſity of Spirit to communicate that Knowledge for the publick Good.

We have not inſerted the Subſtance of them in the Chapters, where we have treated of the Articles they concern, partly becauſe not haveing experienced them ourſelves, we have no right to recommend them to the Planter as certain Practice; and, partly, that we might not defraud their Authors of the Merit of them. We believe them to be right and uſeful, otherwiſe we ſhould not have inſerted them, but the ſureſt Method of knowing will be by Trial, to which we recommend them, not doubting the Succeſs, though we are not able from Proof to inſure it.

LETTER I.

On the Choice of Ground, and Manner of Planting.

SIR,

" If the Experience I have had in the Hop " Way is of any Uſe, I ſhall be glad to ſerve " you. In the firſt Place, if you expect a good " Ground, let it be free to the Air. I find " wherever the Air can't get through, Hops " blaſt, and in the Middle of the Ground they " ſhall be all ſpoiled, at the ſame Time they " are quite good at the Sides. One great Elm " in a Neighbour's Ground has ſpoiled me many " a Bag of Hops, it ſtands juſt where the Air " ſhould paſs; and there are two others behind " it, ſo that I am then quite choaked up: my " Hops for eight, ten, or a Dozen Hills juſt " there are many Years ſpoiled, while all the " reſt are in Order.

" I find it inconvenient to have all my Hops " ripen at a Time, for there is oftentimes no " getting Hands enough to manage them. For " this Reaſon I now plant three Sorts; the " Early-white, the Long-white, and the Oval. " The firſt of theſe ripens a Fortnight before " the two others, and the Oval is commonly a " Week later than the Long-white. So I have " three Seaſons. The Early-white don't yield " a great Crop, but they come early to Mar- " ket, and fetch a Price, ſo I find one Thing " anſwers for another: and this I know, ſince " I followed this Way, I have always more

" Profit than I uſed to have, and not half the
" Trouble. If others will do the ſame, they'll
" find the Truth of what I ſay.

I am,

With Reſpect,

Your humble Servant,

Arthur Collins.

LETTER II.

On the Planting and Management of Hops the firſt Year.

SIR,

" Whereas it is the common Way to plant
" four Sets of Hops in a Hill, one at every
" Corner, I bethought me in planting a new
" Hop Ground, to try Practices, and plant
" more: ſo in ſome I put twelve Sets, three on
" each Side, in other ſome ten, in ſome eight,
" and in others ſeven, ſix, five, and others
" four; in ſome alſo I put only three, and in
" others two, and in a few but one Plant a-
" piece, ſticking it juſt in the Centre.

" Now by what I find after many Years
" Tryal in this new faſhion'd Hop Ground,
" our Planters have not found out the right
" Number. Where I have only one Hop in
" a Hill, it bears full as much as two in the
" common Way; and where I have ten or a
" dozen, they ſtarve one another, and don't
" yield ſo much as four. I find therefore upon
" the whole, that placing the Hills at the com-
" mon Diſtance, each will very well feed ſix
" Plants, if the Ground be well tilled between,
" and they will yield every one nearly as much
" as one where there are only four. But ſup-
" poſe the ſix thus yield as much as five, when
" there are only four on a Hill, ſtill it is gaining
" a great Advantage.

" I find that my ſingle Plants are liable to
" feweſt Damages, and the thickeſt planted to
" moſt: but I don't ſee any material Differ-
" ence in that Way, between ſix and four on
" a Hill. This I thought good to tell for the
" Benefit of others, depend upon it ſix Plants
" in a Hill is the beſt Number can be raiſed.

" There is one Thing more it may not be
" amiſs to tell you of. We have got a Way
" here of loſing the firſt Year of a new Hop
" Ground, having a Notion that to let the
" Plants bear the firſt Year, weakens them for
" ever afterwards. I'll tell you how that is. If
" the Ground be planted in Spring, as ſome do
" it, then there is ſo little Time between that
" and the Hop Seaſon, that there will be a
" ſmall Produce, and it will be better to pre-
" vent than encourage it, for the Plants had
" better be rooting than yielding a few ſcatter-
" ing Fruit: but the right Seaſon of planting is
" the Beginning of October, and in that Caſe
" the Sets root before the Cold of the Winter,
" and have Time to ſtrengthen themſelves in
" the Ground before the Spring ſhoot. They
" will therefore come up ſtrong, and as well
" as ſome Spring planted Hops the ſecond
" Year. In this Caſe they will yield a very
" good Gathering the firſt Summer, and it is a
" very idle and waſteful Thing to neglect ga-
" thering of them. I have found it thus in
" many other Things concerning Hops. People
" follow one another's Practice right or wrong,
" without conſidering that what is right in one
" Reſpect, may be wrong in another."

I am,

SIR,

Your humble Servant,

LETTER III.

On the picking of Hops.

SIR,

" I have found many Inconveniencies attend-
" ing the uſual Way of picking of Hops in the
" open Ground, for which Reaſon I have now
" many Years built for that Purpoſe. I am
" ſenſible the Name of Building is enough to
" ſtartle People not uſed to theſe Things, but
" mine is only a Shed, the Coſt very little, and
" the Convenience great on many Occaſions.
" My Shed is only a Top, two Ends, and a
" Side, being open all the Length one Way;
" and the Materials of the cheapeſt Kind. The
" Length is two and twenty Foot, and the
" Breadth twelve. This conveniently holds
" two Frames in the picking Seaſon; and at
" all other Times it ſerves to houſe the Tools,
" to put by any Thing like to be wanted,
" and in Winter to lay by the Poles. I never
" have my Poles above twenty Foot long, ſo
" there is two Foot over Room to hold
" them.

" In the picking Seaſon I ſet up two Frames
" lengthways in the Shed, and have juſt Room
" for the People to ſit Back to Back between
" them.

" My Frames are ſeven Foot and a half long,
" and three and a half wide; they are made
" of nothing but four Poſts for Corners, ſet up
" firm in the Ground, with a Hair-cloth tack-
" ed over them, and a Couple of Forks to
" hold up the Poles. The Poles are laid over
" theſe, with the Vines over them, and the
" Pickers work along the Sides, and at the
" Ends, picking the Hops into the Cloths.

" Thus I find no Damage nor Danger from
" Wind, Sun, or Showers, and my Work in
" every Reſpect goes on better than my Neigh-
" bours.

" Many of them make the ſame Sort of
" Frames that I do, removing it from one Part
" of the Ground to another; but I have always
" found the fixed Shed beſt, and mine are not
" ſmall Grounds. The Poles are ready to be
" laid up, and there is no Danger of Acci-
" dents. My Hops are picked clean and dry,
" and they are not afterwards broke by tum-
" bling about, for it is only taking up the
" Ends and Sides of the Hair-cloth, and they
" are carried away as it were in a Bag directly

The Perſon to whom the Proprietors of this Work have committed the Care of its Publication, having received Accounts, from many Parts of the Kingdom, of the great Damage done by the late Floods in overflowing large Quantities of Land, applied to that ingenious Gentleman who favoured them with the moſt judicious and uſeful Method of Stacking Hay to prevent its firing, publiſhed in a former Number, to requeſt his Advice to the Farmers in this great Calamity: he has in Return been favoured with the following Letter, committed to the Care of Mr. OSBORNE, *one of the Proprietors; which, with the utmoſt Gratitude for the Obligation, he here preſents to the Reader.*

Mr. OSBORNE,

Jan. 15, 1756.

SIR,

I Have peruſed Mr. ------'s Letter to you of this Date. That learned and uſeful Member of Society, as well as great Genius, does me much Honour in declaring, my ſimple Contrivance for Stacking Hay with Safety, met with the favourable Reception and good Opinion of the Publick; and that it has been of any Service and Credit to ſo important, and, as far as I am able hitherto to judge, ſo excellent a Work as the preſent *Body of Huſbandry*; every Number of which I wait with Impatience, and read with Satisfaction; pleaſing myſelf with a conſcious View of Ten Thouſand *Cornu Copia's*, and national Benefits riſing out of it.

If the Remainder of this noble Work be equally conſidered, and equally ſupported by Science and Practice, I ſhall not heſitate to pronounce it an Honour to the BRITISH Nation, as well as the Undertakers; and doubt not but it will ſoon fly through the living Languages of EUROPE.

I flatter myſelf the Plan and Deſcription of my new invented Granary, which I deſired you to tranſmit to the Gentlemen concerned, may merit their Conſideration: it coſt me much Thought and Contrivance to make it ſtrictly ſupportable by the Laws of Pneumaticks, and to anſwer all its Purpoſes with Oeconomy, and without the late ingenious Invention of Ventilators, to which the ENGLISH and FRENCH have hitherto confined themſelves.

That learned Gentleman makes uſe of an Argument that will always command my Regard and beſt Endeavours, the *Publick Good*; and he has with Sincerity, my warmeſt Deſires to ſerve them, and oblige him in his Requeſt.

I ſhall firſt ſay, in the preſent Caſe, that I apprehend no Engine in Nature can be properly and efficaciouſly applied, to the ſpeedy draining of great Surfaces of Lands accidentally overflowed.

We muſt allow that Wind, Sun, falling of Rivers, and Imbibition of the Earth are the Productions of the great Engineer: He leaves it to us to find or create Levels, in this particular Caſe, if we are impatient of his Operations; and He expects we ſhould, on ſuch Occa-

Occaſions, add the Knowledge and Skill with which he has bleſſed us.

I ſhall only obſerve, nothing can be attempted by us, whilſt one uniform Surface of Water covers contiguous Rivers, Drains, Ditches, and Lands, as in many Places it does at preſent; but the Moment ſuch Rivers or Drains have acquired a natural Level, by the running off of ſome Part of the Inundation, the higheſt Parts of thoſe overflowed Lands beginning to appear, the moſt adviſeable Inſtrument to apply is the LINCOLNSHIRE trenching Plow, or, for want of it, a ſtrong common two wheel Plow; beginning near the River, or Level's Edge, and cutting up as far as conveniently may be, into the ſhallow Verge of the ſtagnant Inundation: aſſiſting the Cut occaſionally with the Spade.

This main Cut, after the Waters have wholly diſappeared, ſhould be enlarged in Depth and Breadth, and ſeveral ſmaller lateral Cuts be made with the Plow, where the gradual falling of the Body of Water indicates; by marking out daily the ſucceſſive Verges of all the ebbing Pools or Shallows, that approach neareſt to the Level of the main Cut, and afterwards running the Plow along ſuch marked Lines of Direction, thereby opening the eaſieſt Communications between the ſeveral Shallows and the main Cut; employing the Spade alſo in ſuch lateral Cuts where neceſſary.

This is the beſt Time to diſcover the trueſt and moſt advantageous Situation for ſuch open Drains, and to obviate an injurious Duration of ſuch future Floods or Inundations, Water being the beſt and cheapeſt Level for the induſtrious Farmer when it happens ſo; and its Retreat, eſpecially in large Paſtures, ſhould be carefully watched and ſtaked out with ſmall wooden Pins.

The young Farmer need only be told farther, that all ſudden Floods, of ſhort Duration, are greatly beneficial to Graſs Lands, as they convey and depoſit Matter of great Fertility upon the Grounds they ſo viſit. But theſe differ widely from the preſent grievous continued Inundations. I heartily wiſh theſe Hints may prove uſeful, and am, with Compliments to ----- for the Honour he does me,

SIR,

Your obliged humble Servant,

JOHN STEVENSON.

"to the Kiln, where they are emptied into "the Bed for drying."

SIR,

Your very humble Servant,

R—. R—.

CHAP. XXII.

Of Flax.

THE Value of Flax is encreased by the easy Manner in which it is to be cultivated. Scarce any Produce whatever may be made to bring in greater Advantages, and none is so much neglected. We import from Abroad at a great Price, what we might raise as well at Home; nor is there any Thing to discourage us from the Attempt. We have laid down in the several preceding Chapters, the Method of managing Hops; an Article of Difficulty, which yet in many Places is executed with great Familiarity; and, we hope, from the light wherein we have set it, that it will be in many more.

What we have to say of Flax, though we shall deliver its Management as fully, will be comprized in a much smaller Compass, and the Trouble of the Person who shall be induced to raise it, will come in a much smaller and shorter Way.

Flax is a slender, tall, and pretty looking Plant. It is too tender to keep itself well upright singly, but in a Field where it is sown together in a Body, nothing stands better: this is the Case with Wheat, which if a single Stalk were raised, would not be able to stand before the Wind; though in a Field it very well supports itself.

Flax is an annual Plant. Its Root is small and fibrous, and perishes as soon as the Seed is ripened. The Stalk is round and smooth, and it rises to three or four Foot in Height. The Leaves are small and narrow, and of a pale green. The Stalk grows strait and single to the Top, where it divides into three or four little Branches, and on these grow the Flowers, and after them the Fruit, containing several Seeds. The Flowers are large and blue, so that when the Plant is in Flower a whole Field together, it makes a very beautiful Appearance.

The Plant is thus known at sight, and is very pretty; the slender upright Stalks, small Leaves, and large blue Flowers distinguish it: when examined more nicely, each Flower is found to stand in a small green Cup, made of five pointed Leaves: the Flower itself in the same Manner consists of five Leaves; they are narrowest at the Bottom, and widen all the Way to the Top, so that the whole has the Shape of a Funnel. In the Center stand five very short Filaments, each having at the Top a Knob or Button, shaped like an Arrow's Head; and in the Centre of these is the young Fruit, on which grow five very short and small Threads, bending at their Tops, and having no Knobs or Buttons on them.

We have shewn that in the Hop those small Knobs on the Filaments, contain a Dust that impregnates the Fruit, and perfects the Seeds; they are of the same Nature in this, and all other Plants, but in this, as in most others, they stand together with the Rudiment of the Fruit, in the Bottom of one and the same Flower: whereas in the Hop, and a few others, they grow in different Flowers upon the same, or upon different Plants of the same Species.

The Husbandman will not be displeased that we thus inform him of the Structure and Nature of Flowers; we would have him ignorant of nothing that relates to his Profession, and this is no idle Curiosity: he who best understands Plants, will be able best to raise them.

In Books of Botany these Things appear very intricate, but we have explained them in a few familiar Words.

When the Dust from these Buttons has shed itself upon the crooked Filaments which stand among them, and which rise from the young Fruit, the Leaves of the Flower fall off. Although they are the gaudiest Part of the Plant, they are of no other Use than to defend these little regarded Threads from Injuries, while their Dust is ripening. As soon as that has shed itself upon the Points, which rise from the Rudiment of the Fruit, they die away and fall off. The Threads themselves also fall off, and as in this Case of the Flax, so in all others, nothing remains but that Rudiment of the Fruit or Seed Vessel we have described. This encreases in Size, and when ripe, is a Seed Vessel of a roundish Shape, but marked with five slight Ridges, and terminates in a Point. It contains ten separate Cells or Compartments, in which there are contained the Seeds: these are of an oval pointed Form, smooth, flatted, and brown, and there is only one of them in each Division or Cell of the Head.

This is the Description of the Herb which affords our Linnen. It has been known in very early Ages, the GREEKS having called it by the same Name, and used to the same Purposes with the present; and it seems to have been originally a Native of some of the Eastern Countries, though it is not easy to trace its Time of being brought into the North: at present 'tis cultivated in most Kingdoms, and as we shall shew, deserves to be much oftener raised in ENGLAND.

CHAP. XXIII.

Of the several Kinds of Flax, and Choice of the Seeds.

THIS one Thing to speak as a Botanist, and another as a Husbandman, this is seen in treating of the Kinds of Flax: the Curious in Plants reckon up no less than twenty, but the Farmer needs to know but one.

We shall not farther particularize this, than that it is the Flax just described, and is the only Kind raised any where for Use.

We see a Kind of Flax wild about the Borders

ders of Fields in ſome Places, and it has been diſtinguiſhed by ſome as different from the other, but it riſes from Seeds of Flax ſcattered by Accident, and only differs from the right Flax in being ſmaller and weaker, as Things that run wild always do from ſuch as are cultivated.

In a Crop of Flax a great deal will depend upon the Goodneſs of the Seed; and we find too often that this ripens but poorly in ENGLAND.

We have ſhewn on another Occaſion, that moſt of our Neighbours import the Seed of their Flax from FLANDERS; but it is better to get it from the Eaſt. Every Plant has its native Ground on which it riſes to the greateſt Perfection, its ripening the Seed is the compleat Perfection of its Growth: and this will be beſt done where it is native.

We have obſerved, that it is natural to ſuppoſe Flax originally came from the Eaſt, and there is this Evidence in Support of the Conjecture, that it no where ripens its Seed ſo well.

For this Reaſon, that the Farmer may ſet out right in this Undertaking, we adviſe him to get his firſt Seed from the LEVANT, enough of it is imported every Year, only let him take Care to enquire for the right Sort, and to deal with a Perſon of Integrity who will not deceive him.

When he has got a Quantity of this, right and fine for his Purpoſe, it will be ſufficient for ſome Time; the Seed of his own Growth raiſed from this, will be good three Crops, if it ripen favourably, ſo that he need not have any more for four Years; but by that Time, in Spite of all the Care he can employ, he will find it begin to run weak, and then he muſt have a freſh Parcel from the ſame Place.

We ſhall lay down the Rules by which our Huſbandman may be ſecure of raiſing a profitable Crop of this Commodity; but let him take Care that he make no Miſtake in the Seed: that would be a Fault no ſucceeding Care could remedy: ſuch a Stumble at the Threſhold would keep him for ever out of the Houſe.

CHAP. XXIV.

Of the proper Land for Flax, and the preparing it.

WHEN the Huſbandman has got his Seed, the next Thing is to conſider on what Parcel of his Land to ſow it. Flax will grow on almoſt any Soil, but it will grow where it will not thrive, and in this Caſe there will only be the Amuſement of looking at the Beauty of its Flowers, for there is to be expected little Profit.

To raiſe it to the moſt full Advantage, it muſt have the beſt Ground that can be given it. Flax, though a ſmall rooted Herb, exhauſts a vaſt Quantity of Nouriſhment. Inſomuch that it will impoveriſh the richeſt Piece of Ground in a little Time, but it very well pays the Damage.

The Field to raiſe it to Advantage, muſt have a light deep mellow Soil, the more like Garden Ground the better, and it will never ſucceed ſo well as when it comes upon a new Piece of Tillage.

As to the Choice of Soils, a rich Loam is by much the moſt proper for Flax: and inſtead of following almoſt any other Crop, tho' with the beſt Dreſſings, to prepare for it; 'tis much the beſt to ſow it on new broke up Ground.

The converting of Paſture into Arable, if the Soil ſuits Flax, is a very beneficial Opportunity for the ſowing of it; but it will ſucceed beſt upon a broke up Saintfoin Lay; for the Flax roots very ſhallow, and the Saintfoin very deep, ſo that the Surface of the Ground, which is all the Flax meddles with, is left quite unexhauſted.

On ſuch a Field with a proper Soil and good Seed, Flax will yield a more profitable Crop to the underſtanding Farmer, than any Thing whatever; but in this Caſe, to continue the Benefit of ſuch Crops, he muſt change not only his Seed, but his Ground at proper Seaſons, for the ſame Land will not, with any Management whatever, bear many ſucceſſive Crops of Flax to the Owner's Advantage.

This uſeful Product is an Exception to what has been ſaid concerning the new Method of Huſbandry by the Drill and Hoe Plow. Mr. TULL has ſaid, and his Followers have repeated it after him, that by his Method of hoeing between the Rows, one Piece of Ground will be enabled to maintain the ſame Kind of Crop ever ſo long. Flax, whoſe Culture probably Mr. TULL had not experienced, proves the contrary; for Trial has ſhewn that no Culture or Management whatſoever, will enable the ſame Piece of Ground to bear Crop after Crop for ſeveral Years.

We do not give this as a Proof that the new Huſbandry is not proper for Flax; on the contrary, there is no Crop whatſoever wherewith it ſo well agrees, nor is this to be raiſed any Way with near the Benefit that it is by the Drill and Hoe Plow; but ſtill the ſame Land will not continue to yield it well. Half a dozen Crops are the moſt that can be got from a good Field by this Method; and it is not eaſy to get more than four by the common Huſbandry.

After this the Field muſt be well manured for preparing it to raiſe ſome other Crop, and the next ſowing of Flax is to be upon ſome other Ground.

What we have ſaid of the new Huſbandry in general, is thus explained under the ſeveral Particulars: it is better than any other Method; but it does not come up to all that has been written of it; and though it may in many Places ſupply the Uſe of Manure, yet to have the greateſt Advantage, both muſt be uſed together.

The Farmer has got his Seed of the right KIND, and he has fixed upon the Piece of Ground where he will ſow it; the next Thing then is to prepare for its Reception.

The great Points here are two. To break the Earth very fine, for the Roots of Flax are ſmall; and to keep down Weeds.

We ſuppoſe the Piece of Land to be new broke up for Flax, and in this Caſe it is to be wrought over ſeveral Times, to reduce it to the needful

needful Fineneſs, it will be worth while to beſtow good Pains upon it for this Crop; and the Flax will never thrive ſo well as if it be ſown on Land laid as Level as the Border in a Garden.

Let the Ground have the laſt working about the third Week in MARCH, and then let the Seed be ſown. This is an Article which we ſhall conſider ſeparately, as there are two diſtinct Ways of doing it, that by the Drill and the common Way by Hand; and on the former we ſhall be more particular, becauſe we have Experience upon a Trial, which perhaps no others have made in this Kind. We wiſh to ſhew with Impartiality, all the Advantages of the new Huſbandry, and although more has been ſaid of it than is true, this Species affords us one, and that very conſiderable.

CHAP. XXV.

Of the ſowing of Flax.

THOSE who have written of the ſowing of Flax all mention the doing it by Hand, for there are none who name this Species that have written ſince the Horſehoeing and Drill Huſbandry have been brought into Uſe. We have Proof that Flax is to be raiſed in very good Crops by the common Method, but Experience ſhews that it may be raiſed much better the other Way.

The great Damage done to Flax in its Growth is by Weeds; and theſe can no Way be deſtroyed ſo perfectly as by the Horſehoeing Method. The Reaſon that Weeds do ſo much Damage to Flax is, that in its firſt Shoot it is for ſome time very weak. In the common Methods of Huſbandry the Weeds riſe with it, and they being ſtrong and the Flax weak, they get the better of it; rob it of its Nouriſhment, ſtunt it in its Growth, and it never recovers. This the Perſons who raiſe Flax very well know, but they do not know how to prevent it: they have tried many Methods, but ſome of them have been fruitleſs, others prejudicial. It is for this Reaſon we recommend the Horſehoeing Method for Flax, the Succeſs of which we have proved by Trial.

However, as ſome may be bigotted to the old Way, we ſhall lay down the needful Directions for doing it in the beſt Manner, according to that Practice; and afterwards proceed to the other.

If the Farmer chuſes to raiſe Flax according to the old Method of Huſbandry, he muſt lay his Ground flat and even, with all the Clods broke, and the whole fine like a Garden Border; then he muſt ſee his Seed ſown by Hand, in the moſt careful Manner, by ſingle Caſt. This done he is to go over the Land lightly, with a Couple of fine Harrows joined together, and having thus covered the Seed he is to leave the reſt to Nature. The Time of ſowing Flax is the laſt Week in MARCH, but if the Weather be cold it may be deferred till the Beginning of APRIL. The Flax will be ſure to ripen for Uſe if ſown in the Middle of APRIL, but unleſs it be got into the Ground early, the Seed does not ripen to ſo good Perfection.

We have ſaid when the Farmer has let his Seed into the Ground, and covered it with the Harrow, he is to leave it to Nature: it is not that the Flax wants no farther Care, but he can do no more for it. There is no Growth that has more Need of proper Management afterwards, but in this Way of raiſing it there is no doing the Crop that needful Service.

Weeds will grow up among the young Crop; the wetter the Spring the more of them; and we have ſhewn the Damage they do to Flax, but what is he to do, he cannot get in to hoe them up?

One Practice there is in this Way, which is the turning in of Sheep, but though this may be of Service, it is capable alſo of doing great Harm; ſo that it muſt be done with Caution.

When the Rains of the Spring have filled the Flax with Weeds, ſome have ventured to ſend in Weeders, but their Feet do more Harm than their Hands can do Good.

The other Method of turning in Sheep is much better, but the Time muſt be hit very nicely; if the Flax be too low they will tread it down and deſtroy it; and if it be grown to ſome Height, and the Stalk firm, they will break it with lying upon it, and it will never well recover.

Theſe are the Diſadvantages of Sheep turned in upon a Growth of Flax, but if the Huſbandman can hit the exact Time it will do very well, there is a Length of the Flax at which it will not be in Danger of being trampled in by the Sheep; and at which it will riſe again after their lying upon it. This is when 'tis about five Inches high; and if Sheep are turned in upon the Ground then, they will eat up the Graſs and Weeds; and the Flax, receiving little or no Damage, will ſtand the reſt of its Time free from its worſt Enemies.

This is the Method of managing Flax from the Seed to the full Growth, according to the common Methods of Huſbandry, but we ſee this is hazardous and imperfect: the Seed is ſown at Random, and there is great Danger that in deſtroying the Weeds the Crop itſelf is hurt. The ſame Advantages are procured in a cheaper, eaſier, and more certain Manner by the new Huſbandry; and the Method of raiſing it is this.

The Land is to be prepared in the ſame Manner for this, as for the other Method; and the Seed is to be ſown in treble Rows by the Drill, properly ſet for that Purpoſe, leaving the Partitions ſeven Inches broad between Row and Row, and the Interval between every three and three as ſmall as will admit the Horſehoe or Hoe Plow; for there requires no more Space between than is juſt ſufficient for performing that needful Operation.

In the common Way of ſowing by Hand, three Buſhels of Seed are uſually allowed to an Acre, when it is the freſh Eaſtern Seed, and all very fine and full, half a Buſhel leſs will do; in the Drill Way one Buſhel is enough for an Acre, and the Stalks riſe more numerous, and grow tenderer and finer for it.

As ſoon as the Seed is in the Ground let the Huſbandman prepare for hoeing. He is not ſo much to mind the ſhooting of the Flax, as the riſing of the Weeds; and this is a Seaſon when they will be very ſpeedy and very numerous. The young Crop ſhould have all the Nouriſhment the Land affords, therefore theſe are to be deſtroyed in the very Act of riſing. Let the Intervals be turned up with the Hoe Plow upon the firſt Appearance of any Weeds, and this will anſwer ſeveral excellent Purpoſes: it will deſtroy thoſe Weeds, and at the ſame Time prepare the Earth of the Intervals, to admit the Roots of the Flax freely, and they will be well ſettled in it in the Midſt of their proper Nouriſhment, before any ſecond Crop of Weeds can riſe.

As ſoon as the Flax has got a little Height, let Hoers be ſent in with Hand Hoes to clear away the Partitions; and thus the Growth will have all the Nouriſhment the Earth can afford for its firſt Shoot, which will be vaſtly ſtronger than it is to be obtained any other Way. By theſe Means the Flax will get ſuch a Footing in the Ground, before any other Crop of Weeds can riſe, that it will be too ſtrong for them. As they would have ſtarved the Flax before, that will now ſtarve ſuch of them as riſe in the Partitions, ſo that it would do without any more hoeing there; however, there is no Harm in repeating it by the Hand Hoe, in thoſe ſmall Spaces; and as to the Intervals the Huſbandman is to keep a watchful Eye upon them, and to repeat the Horſehoeing as often as he ſees any Parcel of them riſe, that would exhauſt the Ground, and tend to impoveriſh the Crop.

Theſe repeated Horſehoeings are ſo many freſh Dreſſings of the Ground, ſo that the Crop has new Benefit every Time. No Growth requires this Aſſiſtance ſo much as Flax, therefore the Horſehoeing Huſbandry can never be more proper than for this Species; and the Encreaſe in Growth will very well pay the Trouble and Expence.

What we can ſpeak from Experience is but in a Tryal, but we have Reaſon to imagine from that, that if the Crop of the ſame Quantity of Ground, by the common and new Method were pared, the Profits of that in the latter Way, after all Deductions, would be double.

CHAP. XXVI.

Of the pulling of Flax.

WE have conducted the Farmer, to whom the Culture of this Species is new, from the Choice of his Seed to the full Growth of the Plant, whether he chuſe to raiſe in the common old Method, or by the new. He has nothing to do but to watch its ripening, and to gather it. This however is an Article on which he muſt beſtow a great deal of Attention. There is a peculiar Period at which Flax is fit to be gathered, and this muſt be watched, and the Opportunity ſeized as ſoon as it offers; all before this being wrong, as well as after it. We ſhall endeavour, as particularly as ſuch a Thing can admit of a Deſcription, to ſettle the exact Time.

In the firſt Place it is to be conſidered, that the Uſe of Flax is of a particular Kind. Other Crops are raiſed for their Seed or their Roots, but this for the Stalk; which is to be manufactured in a ſingular Manner, and will yield to the Operation better or worſe, according to the exact Time at which it was pulled.

In other Kinds the Ripeneſs of the Seed, or the Bigneſs of the Root, are the Marks of their being fit for gathering, but in this it is the due Condition of the Stalk. Thoſe Marks are viſible and obvious to the Eye; this is the more difficult to be known, and therefore it muſt be watched the more narrowly.

The Farmer is to conſider, that although the greateſt Part of his Flax is to be pulled for the Stalk, it is proper to let ſome ſtand for Seed.

This makes a different Period of gathering, for if the whole were to ſtand till the Seed was ripe, it would be of little worth. Therefore let the Owner firſt ſet off a Part for ſtanding for Seed, and let this be upon the Edge of his Ground that is beſt defended from Winds, and where there is moſt Sun. If there be a Part open to the South, and backed by a good Hedge, this is the Place. Let him mark out by Stakes what Quantity he will have there for Seed, and then watch the reſt for ripening, only giving Directions to the Pullers to ſpare the Seed Parcel. This particular Part is to ſtand till the Seed Veſſel is very dry and ready to open, and the Seeds, upon opening it, are found to be full and firm. This Degree of Ripeneſs is eaſy enough known, ſo there needs no great Care on that Head; but before this he muſt look narrowly into the other.

It is a very common Practice to ſpoil the whole Crop for the Sake of the Seed. The Owners acknowledge, that if pulled while the Seed is young, the Flax will be the better, but that the Seed will be good for nothing; they therefore let it ſtand till the Seed has juſt begun to ripen, and then pulling it the Seed they ſay will harden and perfect itſelf in the drying.

Thoſe who follow this beaten Path muſt ſee their Flax out of Flower, before they examine it for gathering: they muſt then watch when the Heads turn brown, and begin to bend down the Tops of the Twigs whereon they ſtand, for that is juſt the Time of pulling this Way; but as the Flax is ſure to be much the worſe for ſo long ſtanding upon the Ground, it is much better to ſet aſide a Part only for the Seeds, and pull the reſt when it is in its Perfection.

We would fain lead the English Raiſers of Flax, into this beneficial Way of conducting themſelves. We are ſenſible that our Flax is inferior in its Quality to that of many Parts of Europe, where they have no natural Advantages over us for its Growth, but only underſtand its Management better. The great Article is their pulling it before it is too ripe.

In the Eaſt they ſow particular Spots with Flax purpoſely for the Seed, chuſing for this Purpoſe warm Situations and the richeſt Soils. This is one Reaſon why their Seed is ſo fine, their taking ſuch perfect Care in the Productions

of the Seed Plants, and nurſing them up purpoſely and only for it. We confound the two Purpoſes of ſowing together, we will have our Flax ripen its Seed, and yet be fine in the Stalk, which is impoſſible. Both in the LEVANT, and in thoſe Parts of the LOW COUNTRIES, and everywhere elſe in EUROPE, ENGLAND excepted, when they ſow Flax, they have their large Fields raiſed for the Stalk, and particular Spots for Seed. They can therefore pull their Flax for Uſe juſt at the Time when it is fitteſt, and therefore their Manufacture from it exceeds ours both in Strength and Colour.

Let us here take Example by thoſe other People; there cannot be any Error in following the Steps of thoſe who we ſee excel us in the ſame Article. We have not here laid down their Method of raiſing ſeparate Parcels for Seed on diſtinct Spots, it is ſufficient that our Huſbandman ſo far imitate them, as to ſet apart a certain Parcel of his common Growth for that Purpoſe, chuſing that which has moſt Sun and Shelter.

When the two Conſiderations of Seed and Stalk are thus ſeparated, they will be both better underſtood and better managed. The Huſbandman is to let his Seed Quarter ſtand its Time; but he muſt have an Eye upon the other as it riſes to flower.

In the common Method of Huſbandry the Flax flowers irregularly in the ſame Field. Some of the Seed having been buried deeper, and ſome ſhallower, there has been more or leſs Time required for their riſing; and the ſame Difference is preſerved in their coming to flower: alſo ſome of the Seed lying ſingle and at a Diſtance, and there being Heaps in other Places from this random Method of ſowing, that alſo will make its Share in the Variation; for ſuch as ſtand ſingle will flower a Week before thoſe which are in Cluſters, becauſe of their having more Strength.

From theſe different Cauſes a Field of Flax ſown by Hand, flowers very irregularly, ſome Plants ſooner, others later; and this is a vaſt Diſadvantage in a Crop which ſhould be pulled at one exact Time, and that Time determined only by the flowering.

This affords one Inſtance among many, why the Drill Huſbandry is much better than the common for the raiſing of Flax: for in that Method all the Seeds being let in at the ſame Depth, and diſpoſed with an even Regularity, both the above-mentioned Occaſions of the Difference in coming to flower are prevented; and it is a beautiful Sight to look upon a Field of this Growth, raiſed in this Way, the whole Crop being of the ſame Form, and the ſame Height throughout their Growth, and all burſting out into a Celeſtial Blue together. There is nothing reſembles the Brightneſs and Beauty of ſuch a Crop in Bloom, but a perfect clear Sky in Summer.

This is a very obvious Mark, and this is the Token for gathering. When the Flax is raiſed ſingly for the Manufacture, it is to be pulled as ſoon as ever it is in full Flower, the proper Time is before one Flower falls.

Let the Owner therefore only watch its Bud: when that burſts let him have his Pullers ready, and as ſoon as all the Plants are in full Flower, and there appears the firſt Mark of fading in any of them, let them be ſent into the Field. The more there are of them the better, for the Work would be to pull it all in one Day if poſſible.

This Practice is founded upon the plaineſt Reaſon.

The Flax is an annual Plant: the Purpoſe of Nature is its ripening its Seed, and when this is done it periſhes entirely. The Uſe we make of the Stalk is accidental, in Reſpect of the Plant's Growth; and we are to ſeize the Period accordingly.

The Articles of Value in the Flax are the good Colour, and the Firmneſs of the Threads in the Stalk: now theſe Threads arrive at their Perfection when the Plant flowers. They have been gradually coming up to it before, and from that Time they are gradually declining from it; therefore that is the Period of Perfection, and at that they muſt be taken; in all Things when Perfection is attained, the next Step is toward Decay.

While the Flax is growing to its Height, the Threads in the Stalk are green and tender; when it has arrived at its full Growth they are white and firm, and as ſoon as that Period is elapſed they grow brown and harſh. This Period is very ſhort, and it muſt be ſeized, for all depends upon it; and happily for the Owner Nature is not remiſs in marking it, if he be not negligent in taking her Inſtructions. The Time of flowering is the exact Time of this Period. This is a very viſible Notice, and let it be taken accordingly.

The Flax always flowers juſt when it has arrived at its full Stature; it never flowers regularly before, nor except by ſome Accident defers it longer. Therefore till it is in Flower the Fibres in the Stalk are green and weak; when it is in Bloom they are white and ſtrong; and when it loſes the Flower and is ripening the Seed, they become harſh and brown. Whiteneſs and Strength are the Qualities we require in theſe Fibres, therefore the Period of flowering is the exact Time whereat the Plant ſhould be gathered.

We ſee in all Herbs that the Stalks are weak and tender till they flower: they are firm and in their Perfection when the Plant is in flower, and they dry up and grow brittle when the Seed ripens. Flax follows the Courſe of other annual Plants, and muſt be therefore pulled when the Flower is juſt opened, in order to have it in the full Degree of Strength, Colour, and Perfection.

When the Pullers are ſent into a Field of Flax, they are to be ordered to be as expeditious as poſſible in their Work. The Flax roots very lightly, ſo that the leaſt Touch takes it up, and this is the Reaſon of the gathering it by Hand in that Manner. As they pull it up they muſt gather it into Handfuls, and tying theſe together they muſt be ſet up in the Field at Diſtances one from another. In this Condition they are to ſtand till they are thoroughly dry: the Sun and Air ſoon do this perfectly, and they grow firm but not harſh in the drying.

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As ſoon as perfectly dry the Handfuls are to be houſed, and they are then ready either for Sale to the Manufacturers, or for the Uſe of the Owner if he will work them himſelf, by which he may be very well aſſured he will get the greateſt Profit.

CHAP. XXVII.

Of the working of Flax.

WHEN the Flax has been well dried after the pulling, the next Operation is what is called Rating of it; as to the houſing the Bundles, that is a Matter merely of Convenience. If every thing be prepared, and the Huſbandman manufacture it himſelf, he may take it directly from the Field to the Water; if otherwiſe it is houſed, to keep it out of the Way of Harm.

Rateing of Flax is ſteeping it in Water, in order to looſen its Bark or Rind. The thready Part of the Stalk is all that is to be uſed, and therefore the firſt Thing to be done is to ſeparate the Rind from it, that not being thready or any Way uſeful.

Experience ſhews that the beſt Manner of doing this is by ſoaking it in Water, and that is the Rateing of Flax: it is done thus. They lay the Bundles in a ſhallow Pond or Ditch, dug for that Purpoſe, putting ſome ſlight Weight upon them to keep them under the Water, and every other Day they are to be turned.

When they have lain thus ſix Days they are to be taken out, if the Bark be ſufficiently looſened. This is eaſily known by rubbing one of the Stalks from the Middle of the Bunch between the Fingers: if the Bark part eaſily they have been rated enough, if not they muſt lie a Day or two longer, but uſually, at that Seaſon of the Year, ſix Days are ſufficient, ſometimes it is done in five.

When taken out of the Water the Bundles are to be ſpread abroad and dried; and they will thus be prepared for the brakeing. This is the ſecond Operation they go through, in order to being prepared for Linnen. This is performed by a particular Inſtrument made for that Purpoſe, and called a Brake, it is notched at the End or throughout, according to the various Methods in different Places, and with this the thready Part is ſeparated from the Bark and looſened. The Method is to begin at the Root, and go all the Way up to the Top.

When the Flax has been thoroughly broke by the Brake, it hangs in Threads and ſcattered Pieces, and it is then ready for the third Operation, which is the ſwingling. This is a Kind of beating, and is to be performed with an edg'd Stick, called for that Reaſon a Swingle. This ſeparates the Fibres more, and it always lays them more regularly, and by this the Flax is prepared for the fourth Operation, which is the beating.

For this Purpoſe the ſwingled Flax is laid on a Block, and laboured with a Beetle, or it is put into a Trough, and beat with a Hammer, and this beating is continued till the whole Subſtance of it is made ſoft and pliable.

When the Flax has been ſufficiently beat it is fit to be hackled or combed. This is done ſomewhat in the Manner of combing of Wool, what are uſed in this Caſe for Flax being called Hackles.

It is to be worked thoroughly through theſe, one after another, till all the ſhort Stuff is got out; and all the long and fine Fibres are made ſmooth, and lie evenly together in Form of ſo many Threads; in this Condition it is fit to be ſpun.

This is the whole Proceſs in forming the Stalk of the Flax, gathered at a proper Degree of Maturity, into Thread, and thence into Linnen; the whole is very familiar, and can admit of no Miſunderſtanding. It were exceedingly to be wiſhed that the Plainneſs of the Practice, and the great Profits would lead more into the Work.

When any large Work of this Kind is carried on, there need be no grudging of the Expence of Implements; and where leſs there are various Ways of contriving to ſave Money. In ſome Parts of England all the Trouble and Charge of beating Flax by Hand is ſaved, by a particular Structure of their Corn Mills; they make the Axle-tree of the principal Wheel longer than uſual, and they place Pins in it, which by the Motion of the Mill raiſe large Hammers: theſe beat the Hemp in the Manner of the Hammers uſed in Fulling Mills. Many other Contrivances in this Way might eaſily be made, but the firſt Point is to get People into a Way of ſetting about the Culture of the Flax.

Thoſe who raiſe the Flax for the Stalk and Seed both, have a neceſſary Operation which we have not yet named, becauſe in this Practice we adviſe, all that is concerned is the Stalk only, the Seed being reſerved in Parcels kept for that Purpoſe. However, that no Information may be wanting for thoſe who raiſe Flax in their own Way, we ſhall add the Method of ſeparating the Seed before the Stalks are put to be watered.

This is called ripling, and it is thus done. The Flax being pulled when the Seed begins to be brown, for that is the Time according to this Practice; when the Bundles have ſtood up ſeven or eight Days, and are pretty well dried they are to paſs through the Ripple; this is a Kind of combing of the Stalks. The Ripples are made of Wood, and have their Teeth ſo cloſe, that when drawn over the Stalk they ſtick at the Heads or Seed Veſſels, and pull them off.

When this is done the Bundles are to be put into the Water, as has been directed already; and as to theſe Seeds not being yet altogether dry, they are to be laid by in an airy Room till Spring, when the whole is to be thraſhed in the common Way, to ſeparate the Seeds from the Huſks.

This Operation, in ſome Degree, prepares the Stalks for rating: but it is not neceſſary. According to our Advice no Regard is to be had to the Seed of that Flax that is raiſed for manufacturing; and therefore the whole Bundles, when they are moderately dried, are to be put into the Water, where the Leaves will fall off about the third Day, and ſometimes the Stalks will

will be ready for their firſt Dreſſing the Day but one afterwards, and ſometimes the very Day after.

The Time of taking them from the Water is one of the critical Points in the managing and manufacturing of Flax, it muſt therefore be watched accordingly.

When the Bark will part, and the Threads ſeparate, it is fit for taking out, and that Time ſhould not be let ſlip.

If this happen the third Day there is no Occaſion for any more rating, and if it be not in this Condition on the ſeventh, it muſt lie longer. We have given the common full Time it is in preparing in this Operation, but the Condition of the Flax is to guide the Workman, not any particular Number of Days of lying.

CHAP. XXVIII.

Of Hemp.

AFTER the Conſideration of Flax we are naturally led to that of Hemp, theſe two Species being raiſed for the ſame Purpoſes of Cloth, though the Flax be the finer. The Culture of the two Plants agrees in many Reſpects, though in their Form and Nature, excepting that ſingle Article the Threadineſs of the Stalk, they differ as much as it is poſſible for two Plants to do one from another.

Hemp is a large, tall, buſhy Plant, of a very rough Aſpect and irregular Growth, but ſufficiently upright and firm.

We have explained to the Huſbandman, under the two former Articles of Hops and Flax, the Conſtruction of Plants in Reſpect of their Fructification or Production of the Seed. We have ſhewn that there is a Male Duſt which is to impregnate a Female Embrio, or young Rudiment of the Fruit. In Flax, as in moſt Plants, we have ſhewn that this Male Duſt, and the Female Embrio are lodged in the Boſom of the ſame Flower; but in Hops the Male Duſt grows in a Kind of little Flowers on ſome Plants, and the Female Embrio or young Rudiment of the Fruit on others. This is the Caſe with Hemp, as well as with the Hop; and from hence has ariſen a Diſtinction in this Kind into Sexes.

The Huſbandman obſerving that from the ſame Quantity of Seed there roſe two Kinds of Plant, though alike in Leaves and Stalk, the one bearing little duſty Flowers and no Seeds, and the other producing Seeds without any obvious Flowers, called theſe two Kinds by the Names of Male and Female Hemp.

This was not improper, but they erred ſtrangely in applying the two Names, for they called thoſe Plants which produced Seeds the Male, and the others the Female.

This was ſo contrary to Nature, that being in all Species the Female which bears the Embrio or young, that the Names have been changed; and are now given to thoſe Plants to which they properly belong, that with only Flowers of this duſty Kind being called Male Hemp, and that which has Seeds Female.

After this general Account of Hemp we may proceed to the Deſcription in common to both, for excepting the Flowers and Seeds, the Difference between one and the other is very ſmall, and may be named occaſionally.

Hemp is an Annual Plant. The Root is long, ſlender, divided into Branches, and full of Fibres. The Stalk is thick, upright, ridged, of a green Colour, and grows ſix or ſeven Foot high. The Leaves are very numerous, and are divided in the Manner of Fingers, or in other Words five ſeparate Leaves grow upon each Foot-ſtalk, ſpreading like Fingers, they are of a dead green Colour, rough to the Touch, and notched at the Edges: Tho' five is the common Number of theſe Diviſions, it is not without Variation, for ſome of them have ſix or ſeven.

In this both Male and Female agree, but the Difference between them is, that the Male is the lighter and more delicate Plant. The Stalk is ſmall, and it has fewer Branches; and it is tenderer and more hollow.

On the Tops of this Kind grow the duſty Flowers, which are of a whitiſh Yellow with a Tinge of Green, little and inconſiderable. The other or Female Hemp is more robuſt, the Stalk thicker and more branched, and inſtead of theſe duſty Flowers it bears the Seed.

The Male Hemp is by ſome diſtinguiſhed by the Name of Summer Hemp, and the Female by that of Winter Hemp; becauſe the Male comes to its Ripeneſs a Month or five Weeks ſooner than the other, and it yields the fineſt Thread. The Structure of the ſeveral Flowers and Fruit are curious in this Plant, and very worthy Obſervation.

In the Male the Flower is compoſed of five little hollow Leaves, pointed at the Ends and growing together at the Bottom, in the which ſtand five very ſmall Threads, with each an oblong Button at its Top, of a ſquare Figure.

In the Female there is a green Huſk of an oblong pointed Shape, which ſplits open on one Side, and at firſt contains the Rudiments of the Seed, and afterwards the Seed itſelf, for it does not fall off as theſe Parts uſually do. In this ſtands the Rudiment which is very ſmall, and has two long Points riſing from it, ſharp at the Ends; the Seed follows, and continues ſhut up cloſely in the Huſk.

This is the Courſe of Nature in ripening the Seed of this Plant.

Hemp was known to the antient GREEKS and ROMANS. It is a Native of the warmer Climates: but where it grows wild in Abundance, they cultivate it not the leſs in Fields for Uſe: for the Stalk never has its Perfection in the wild State. It no where grows ſo luxuriant wild as in the EAST INDIES, but even there they raiſe it for Uſe by a proper Culture.

There is properly but one Kind of Hemp. We have mentioned already the Difference of Male and Female Hemp, but they both ariſe from the ſame Seed, therefore they are properly of the ſame Kind, though they differ by Accidents. There is an Account in Authors of a Plant called Virginian Hemp, which is large, and has Leaves unlike ours, they being ſingle, not fingered, neither does it produce its Seed like it, though the Courſe

of Nature in it has ſome Reſemblance. This grows in the Salt Meadows of Virginia, and is called by ſome Acidna. There are alſo ſeveral Kinds of a wild English Plant called Baſtard Hemp; but this is properly a Sort of dead Nettle, and ſhould be called the dead Nettle with Leaves, like the ſingle Leaves of Hemp, diſtinguiſhing the Kinds afterwards, according to their Differences.

Theſe we have thought needful to name, that the enterprizing Huſbandman might not be led to ſuppoſe them ſo many Kinds of Hemp, or to cultivate them as ſuch. This would be purſuing Curioſity at the Expence of Uſe, there are only the Male and Female Hemp he is to regard, and theſe he will always have when he ſows Hemp at all, becauſe they both riſe from the ſame Seed. We have already informed him concerning their Diſtinctions and Uſe.

CHAP. XXIX.

Of the proper Land for Hemp.

THE Culture of Hemp is one of thoſe neglected Articles within the Province of the Huſbandman, by which he who will engage earneſtly and judiciouſly in it, will not fail to make very conſiderable Advantage. We ſhall in this, and the ſucceeding Chapters, lay before him ſuch Directions for the whole Management of his Crop, that he ſhall not be left to ſeek in any the leaſt Point; and ſhall be happy if by ſpiriting up the Induſtrious and Ingenious, we can promote a Thing that will be not only uſeful to themſelves, but to their Country. The Importation of Hemp in various Forms, is a Reproach upon the English Huſbandry, for we are able to raiſe it as well as any of thoſe from whom we receive it.

In the undertaking this Article of Huſbandry, the firſt Thing to be conſidered is the Soil. For there is no Growth whatſoever that ſo perfectly depends upon the Nature of the Land for its Succeſs.

We have Ground enough in England that is proper for it; indeed there is no where ſo much of a right Kind, but let the Huſbandman take Care he does not ſow it upon a wrong.

Hemp requires a deep, rich, light, and dry Soil. In England we have more and finer Loams than in any Country whatever, and theſe are the Kinds of Land that beſt anſwer to this Deſcription. One of our dark duſky Loams in which there is a good deal of Sand, and a large Quantity of pure Mould, will anſwer beyond any other Soil whatever; we have a great deal of this Land in Northamptonshire, Lincolnshire, and Buckinghamshire, and I have obſerved that it there runs very deep, often two Foot and a half or three Foot, with a good open Loam at the Bottom. This is the beſt of all Grounds for raiſing Hemp. It is a Soil that will bear any Crop; but the Farmer will not find any that will bring him a greater Advantage on this Land.

There are Soils that are particularly improper, as well as ſuch as are fitted for this Growth. The moſt wrong of all are cold Clays: on theſe Hemp can never thrive; it is a Native of the Eaſt, where the Soils are light and dry, it is therefore againſt Nature to force it here, to live in a cold, tough, and wet Clay.

The Farmers are aware of this, and therefore I cannot ſay I have ſeen Hemp any where ſo planted; but the other Soil, on which it ſucceeds poorly, is that on which it is too often ſown, this is the deep black Mould that lies in low Paſtures, and is always wet. This is what we have called, in our firſt Book, the rotten mooriſh Soil. The Depth and Richneſs of this would agree very well with Hemp, but it is always too moiſt and too cold.

A deep Earth and Freedom for the Roots to paſs every Way, is one of the Requiſites for Hemp; but Warmth is the other, and this latter is ſo eſſential, that it will grow better in a poor Land that is warm, provided it be deep, than in a very rich one that is too cold.

It is for this Reaſon Sand is ſo eſſential an Article in the Soil for Hemp. I have made it an Obſervation, that I never ſaw this Plant thrive any where, where there was not Sand in ſome conſiderable Quantity in the Ground. I am aware of an Objection that will be made to this Aſſertion, by thoſe who have ſeen Hemp cultivated in the lower Parts of Northamptonshire, but I have ſeen it there, and have anſwered ſo natural, yet groundleſs, an Objection on the Spot.

The Land on which they raiſe Hemp in this Part of England, is a deep black Mould, which has been of the moory Kind; but by the perfect draining of the adjacent Fens is now left altogether dry and crumbly.

Hemp would not have grown here to any Profit, while the Land was wet, but it ſucceeds very well in its preſent State. I have often talked with the Farmers who raiſe it here, and they have told me there was no Sand in the Ground; to convince them I have only waited for a Shower of Rain, after which the firſt Eye that is caſt upon the Ground ſhews it in Abundance.

The Truth is, this is the richeſt Loam in the World, there is a little clayey Matter which holds it very well together, and ſerves to detain Wet enough to keep it always moiſt, and yet not enough to chill it: and there is a conſiderable Quantity of a middling brown Sand: this warms and opens it excellently, but the Body of the Soil being a fine black Mould, that covers both the clayey Particles and the Grains of Sand, till waſhed off by Rains.

This is a particular Soil, but it is not ſingular in that Place; I have ſeen it in Lincolnshire, Warwickshire, and Leicestershire, whereever it is the Farmer may be aſſured, if he will ſow Hemp upon it, he will have a very great Return.

I have ſeen the Experiment of ſowing Hemp on gravelly and ſtony Lands, and as to the Succeſs, that has depended altogether upon the Condition of the Soil in Depth, and the Degree of ſtonyneſs; if it be a deep loamy Earth, with a moderate Quantity of Gravel or Limeſtone Fragments

ments on the Surface, nothing does better, but if it be gravelly to the Bottom, or the Stones be too large, it will not ſucceed.

CHAP. XXX.

Of preparing Land for Hemp.

A Field may be put in order for Hemp, either by breaking it up freſh, or by manuring it after other Crops, but the former is the better Way.

In Northamptonshire they commonly break up Paſture Ground, when they have Opportunities for it; and in ſome of the Counties where they have got into the Method of raiſing the artificial Graſſes, they break up an old Lay of one of them, and it always anſwers very well. Once I ſaw a Piece of Woodland firſt ſown with Hemp, after the ſtubbing up the Roots, and moderately ſpeaking, the Crop was twice as large as I ever ſaw it on any other Piece of Ground: the Soil was very proper, deep, and loamy, and it had lain in Wood many Years.

Whatever Ground be choſen it will require to be very well dreſſed, to prepare for this Growth: not that Dung is ſo proper, for Hemp does not ſucceed well upon it; but a right Degree of Tillage.

This recommends the Horſehoeing Huſbandry, as for Flax ſo alſo for Hemp, before all others, becauſe that gives the neceſſary Dreſſings by Tillage, and omits either altogether or in great Part the Uſe of Dung.

When any Manure is uſed to a Field deſigned for Hemp, it will be better to chuſe ſome other Kind of the ſeveral that we have mentioned in our ſecond Book, and not Dung, ſince Hemp does not affect that. It will be better to improve the Soil by the laſting, than by theſe temporary Additions.

From what has been ſaid it will be eaſily ſeen, that Land which has been bearing other Crops is not ſo proper for Hemp, as ſuch as is freſh. Hemp requires a great deal of Nouriſhment; and theſe Fields are exhauſted by the Crops they have borne: then there is no Way in the common Practice to recruit theſe but by Dung, and that Hemp diſlikes. Therefore the other or freſh Lands are better: but though the beſt they are not the only ones that will do. I write in theſe Things from Experience and Obſervation. I have told the Farmer what I have ſeen, I ſhall add what I have tried. I have made a Piece of Ground that had borne its third Crop in the uſual Way, yield a very good Produce of Hemp by only good Tillage, without any Addition of Manure whatſoever. Therefore it is ſpeaking from Experience as well as Reaſon, to recommend the Horſehoeing Huſbandry for Hemp. Let the Farmer take Care that his Soil be proper, and he may raiſe this valuable Commodity upon it at any Time, or in any Condition, only by a ſufficient Tillage.

This Aſſertion is founded upon Fact, and that cannot miſlead any; and it is the greateſt Proof I know of the Truth of thoſe Principles on which the Practice of Horſehoeing has been eſtabliſhed. Hemp requires a great deal of Nouriſhment, yet it will thrive very well upon Land ſo exhauſted by its third Crop, that it would have yielded nothing elſe to any Profit without a Refreſhment of Manure, there being no Manure at all added for the Hemp, but the whole being done by Tillage only.

This is a Proof that Tillage alone does prepare the Earth to yield Nouriſhment to Plants, for the Hemp thriving ſhews that it has Nouriſhment in Abundance. And there has been, in this Inſtance, nothing but the Tillage to give it.

As to the Practical Directions for a Choice of Land, they may be collected from what we have laid down already. We ſhew here that any Condition of the Land will be made to do, with proper Management; but the beſt is ſuch as has been covered with Wood; the next beſt is ſuch as is freſh broke up, whether from natural or artificial Graſſes: the leaſt favourable of all is that which has been exhauſted by other Crops; but this may be made to anſwer.

Upon this Diſtinction depends the Management of the Land, which is the proper Buſineſs of this Chapter: but could not be thoroughly underſtood without firſt ſettling theſe Diſtinctions. We would have the Farmer in all Caſes know not only what he is to do, but why he is to do it.

Thus in the preſent Caſe, if the Land on which he intends to raiſe Hemp be new broke up, whether from Wood or from natural or artificial Graſſes, all he has to do is to break it ſufficiently fine, and expoſe it a little to the Sun and Air; and then going over it once again to level it, and then get in his Seed; but if it be a Field that has borne other Crops, and is exhauſted, he is to refreſh it, not by Dung but by ſubſtantial Manures according to its Kind, as with Mud, Sand, or the like; and to break and divide it by repeated Tillage, in order to enrich it. In this Caſe, the oftener he goes over the Ground the better, and the more Variety of Inſtruments he uſes the richer he will make it. Let him turn it up deep with a proper Plow, and tear it to Pieces afterwards with a Harrow. Then, in a dry Seaſon, let him draw a heavy Roller over it, to cruſh the Clods; and when he has done this harrow it again, to break thoroughly to Pieces what the Roller only bruiſed.

After this let him give it Reſt for ſome time, that the Sun and Air may penetrate it well, and then begin by plowing again.

Let this Practice be obſerved throughout the Winter, and in Spring let him lay it level and even for his Seed.

CHAP. XXXI.

Of the ſowing of Hemp.

THE Land we underſtand now to be well prepared, whether rich in its own Nature or made ſo by Tillage. We ſuppoſe the Winter Dreſſings to be paſt, and are now got into Spring, that is the Seaſon for ſowing this valuable Crop.

Firſt let the Farmer take Care that he get good

good Seed: if he commit any Error in this Reſpect, all the reſt of his Labour will be fruitleſs. Let him chuſe ſuch Seed as is freſh, firm, and bright; and then try it by rubbing it well between his Hands; if it bear this without breaking, and look the finer and cleaner for it 'tis good, but if it appear duſty, and in Part broken by this it is old and damaged.

Good Seed being thus choſen, the Quantity is to be determined, according to the Method propoſed for raiſing it. If by the common Huſbandry three Buſhels are to be allowed to every Acre: if the Drill and Horſehoeing be followed, which is much beſt, a Buſhel and half of Seed to every Acre is ſufficient.

The Seed being ready and the Ground dreſſed for bearing the Crop, the laſt Operation performed upon it muſt be the preparing it for the Seed; and this, whichever Method of Huſbandry is choſen, muſt be very carefully done.

If the common Practice be followed, the Farmer muſt go over the Ground with the niceſt Care. The firſt Week in April is the right Time for ſowing Hemp, therefore let him begin his laſt Dreſſing accordingly. If the Seaſon be unfavourable, the ſowing may be deferred a Week, ten Days, or even a Fortnight without Damage, but 'tis beſt when it can be done at the Time juſt named.

When the Farmer gives the Land this laſt Dreſſing, he muſt make it fine and level as the Border of a Garden; Hemp Seed is tender, it will not grow unleſs laid in very regularly. It requires but a ſlight Covering, and if it be laid in deeper it will never come up. If any Clods be left in the Ground they will fall over ſome of the Seeds, and ſuch will be ſure to periſh. I have ſeen the bad Effects of Careleſſneſs in this Article, and therefore caution the Farmer the more ſtrictly; he may depend upon this, that in the common Way of ſowing not a third of his Plants would come up; and one half of thoſe that do will riſe irregularly, and getting bad Habits by twiſting in their firſt Shooting, will never come to any thing conſiderable afterwards.

When the Land is of a ſufficient Fineneſs let a careful Seedſman go over it, with the juſt named Proportion of Seed to every Acre, and let him ſpread it regularly over the whole Ground, by ſingle Caſt, as evenly and equally as he can.

As ſoon as this is done let the Field be harrowed over very lightly, and then left to Nature: only with this Caution, that it be well defended from Birds.

There is no Seed of which the generality of ſmall Birds are ſo fond as Hemp Seed: it is a large and conſpicuous Seed, ſo that it attracts their Eye, and it is to be ſlightly covered, ſo that they can eaſily get at it: therefore Boys muſt be ſet to watch, and all imaginable Care taken of it for ſeveral Days after ſowing, otherwiſe the Farmer, with all his former Cautions, will have but a poor Account of it.

This is the Method of ſowing Hemp in the common Way of Huſbandry; and to what has been laid down already we have only one Caution to add, which is, that the Farmer who expects a good Crop do not follow the Practice of thoſe who do nothing to their Land till they are juſt going to ſow it. There are thoſe who content themſelves with giving it one plowing in Spring for Hemp, and no more; but by what I have ſeen they content themſelves alſo with a poor Harveſt. Hemp in its Nature requires a Land better dreſſed than almoſt any other Seed.

We have given the Method of raiſing Hemp according to the common Practice, we are to name the Way of doing it in the Horſehoeing Method, which we have before obſerved is vaſtly preferable. To this Purpoſe the Preparation of the Ground muſt be the ſame, as in the other Method, and the Seed is to be planted in double Rows, with ten Inch Partitions, and with Intervals juſt broad enough for the Paſſage of the Hoe Plow.

We have given Directions at large upon the Manner of ſowing in this Method of Huſbandry, therefore need not repeat thoſe general Inſtructions under every particular Article; only let the Farmer obſerve, that Hemp Seed muſt be planted very ſhallow; and therefore ſet his Drill accordingly.

Hemp is a large Plant, therefore it muſt not be planted in treble Rows, for the middle one wanting Air and Space for its ſmall Roots, would come to nothing. It ſucceeds very well in a ſingle Row; but Experience ſhews, that in the double, with this Interval, the Plants grow as well, and the Profit is much larger. This is the Method of cultivating Hemp to the greateſt Advantage, and with the greateſt Certainty of Succeſs.

CHAP. XXXII.

Of the ordering Hemp in its Growth.

IT is the Advantage of the Horſehoeing Huſbandry, that it ſupplies Plants continually with freſh Quantities of Nouriſhment during their Growth. This is not more neceſſary for any thing than for Hemp, for the filling of the Stalk depends very much upon it. 'Tis for this Reaſon that we have ſo particularly recommended the new Huſbandry for this Species. A Plant raiſed this Way will be often worth four in the common Method.

In that Practice the Hemp is to be left altogether to itſelf, as ſoon as it is well out of the Ground. The Attendance is only required till the Body of the Seed is waſted. Birds will not meddle with it afterwards, and as to Weeds they cannot live among it. 'Tis a quick Grower, and a very ſtrong Plant; and in the Way of ſowing by the common Method, the Shoots will riſe ſo near one another, that they will have enough to do to live well themſelves, till they begin to pierce with their Roots to ſome Depth; and neither then nor afterwards, will they ſuffer any thing elſe to live among them.

Hemp is ſo far from being in Danger from theſe, that it is the beſt Thing that can be ſown for preventing them for the future. Nothing clears a Land ſo thoroughly from Weeds as a Crop of Hemp; but then it exhauſts the Land ſo thoroughly, that it leaves it fit for little elſe without a great deal of Preparation.

We have ſaid the two great Advantages of the Horſehoeing Huſbandry, are the deſtroying Weeds and furniſhing the Crop with Nouriſhment while growing. For the firſt Purpoſe Hemp we ſee does not need its Aſſiſtance; but nothing requires it more for the latter. If Hemp ſatisfies the Farmer in the common Way; it will enrich him in this, for every Plant will ſpeak for itſelf in the Praiſe of this Method of Culture.

When the Seed is let in by the Drill the Danger is not ſo great from Birds and other Vermin, as when ſcattered in the common Way, becauſe though covered but at a ſmall Depth, ſtill it is all covered; but this, though ſome Help is not a ſufficient Security, one Seed that ſhall chance to lie naked will tempt theſe Devourers; therefore it is to be watched in the ſame Manner as when let in in the common Way of ſowing. The Time of the Birds feeding upon the Seeds is principally before Sunriſe, therefore the Ground muſt be carefully watched from Peep of Day: after this they are leſs ravenous, till toward Evening, when they feed again, till within half an Hour of Sunſet.

We don't mean by this that they need not be watched at other Times, but theſe are the Hours wherein they require the moſt ſtrict Care.

When the Hemp has got four or five Inches Height in the Shoot, the Weeds will begin to fill the Intervals; and ſome, though not many, will riſe in the Partitions between the two Rows. Let the Farmer ſend in careful Labourers with Hand Hoes, to cut down thoſe that have riſen in the Partitions; once doing this will be ſufficient, for the Hemp gathering Strength will not permit them to get up any more.

Theſe Hoers ſhould be ordered alſo to pull up here and there a Plant of the Hemp, where they have riſen too thick: but this is an Article of his Employment in which he muſt be ſparing, for the working of the Intervals between, will render the Ground capable of ſupporting the two Rows of Hemp, with the Plants cloſer than can be well imagined.

When the Weeds are cut down by Hand in the Partitions, let the Horſe Hoe be brought into the Intervals, and with this let all the Ground between the Pairs of Rows be turned up deep, and broke very fine. The Weeds will be deſtroyed by this, which were too far off the Plants of Hemp to be ſtarved by them; and the whole Soil will be made fit to receive the Roots of the Hemp, and filled with Nouriſhment to ſupport them.

The Effect of the Horſehoeing is in no Caſe ſeen more perfectly or plainly, than this Inſtance. The Fibres of the Roots of Hemp, even in the moſt favourable Soil, do not naturally ſpread, for they lie in Cluſters about the Baſe of the Stalk, their Number anſwering for their Shortneſs. But in this Way of Horſehoeing the Fibres of the two oppoſite Rows will meet acroſs a five Foot Interval very viſibly, and fill all the Space between; this is plain to the Eye in examining the Roots, and the flouriſhing State of the Plant confirms it.

The Horſehoeing muſt be repeated as often as the Weeds get up in theſe large Intervals; for no more, after the firſt, will riſe in the Partitions; and in this Manner the Ground will be every now and then cleared and enriched, till the Time of pulling the Crop. It will be filled with Nouriſhment by the Work, and all that Nouriſhment will come to the Crop.

CHAP. XXXIII.

Of the pulling of Hemp.

WE have brought our Hemp from the Seed Time to its full Maturity. The Summer has been left for its Growth, and we ſuppoſe we are now arrived at Lammas Time, which is the Seaſon of the firſt Hemp Harveſt. We ſay the firſt, for there are two Gatherings of this Plant in every Ground: the Male and Female Hemp, which always riſe together from the ſame Seed, differing, as we have obſerved, in the Time of ripening.

This makes a very particular Article in the Management of Hemp, and a particular Caution is to be given the Huſbandman not accuſtomed to this Crop, about it.

We have mentioned the Seaſon of the Male Hemp, which is called alſo the Summer Hemp, and by ſome fimble Hemp, ripening. At this Time let him keep his Eye upon the Field, and obſerve when he ſees the Leaves beginning to hang and turn yellow. He will ſee this when once it has begun, ſpread quickly through the Field, but only upon the Male Plants. About the Time of the Leaves drooping and growing yellow, the Stalks turn whitiſh, and this is the Signal for gathering, no farther Care is needful. This Kind bears no Seed, ſo that there is no ſecond Conſideration as there is in the other.

When the Male Hemp has got into this Condition, the Pullers are to be ſent into the Field to get it up. Hemp is gathered like Flax, by tearing up by the Roots, and therefore the gathering of theſe is called pulling. But here there is a great Difficulty. The Flax is eaſily enough pulled up, becauſe it is all to be pulled up; but in the Hemp it is only a Part: and it is not eaſy to do this without damaging the Remainder, a careleſs Conduct in the gathering this Part of the Crop might eaſily ſpoil the other.

When Hemp has been ſown in the common Method, all the Owner can do is to caution his Pullers that they do not trample down, break, or otherwiſe injure the Female Hemp that is left ſtanding; but with his beſt Inſtructions, and their beſt Care, there never fails to be a great deal of Miſchief done. Therefore in this Reſpect, the raiſing Hemp by the Drill and Horſehoeing Huſbandry, in the Method of double Rows as we have adviſed, has a vaſt Advantage. In this Way the Intervals between two and two Rows are ſo wide, that the Pullers can eaſily and freely get in between them; they can take up the Male Hemp without the leaſt Damage to the Female, and they have Room to manage it and get it up into Bundles. All this which is ſo very eaſy in the new Way of raiſing the Crop, is ſubject to the greateſt Difficulty and Diſadvantage in the old.

The firſt Pulling being thus over, the remainder

mainder of the Growth is to ſtand till Michaelmas. It thrives the better and the faſter a great deal in either Way of the managing, becauſe of being thus thinned; and the Time of gathering it coming in late, after the other Harveſt Work is over, is very happy for an induſtrious Poor, in the Places where it is propagated.

The gathering of the Male and Female Hemp is to be done in the ſame Manner, except that there is to be a Difference in the making up of the Bundles. Each Kind is to be bundled up as the Flax, but the Male Hemp is to be gathered into ſmall, and the other into large ones. The Male Hemp ſhould be gathered up into ſuch Bundles as may be graſped with both Hands, but the Female Hemp is uſually got up into ſuch as are a Yard round. This is all the Difference in reſpect of gathering.

CHAP. XXXIV.

Of the drying of Hemp.

IN the Hemp of the firſt gathering nothing is to be minded but the drying it in a proper Manner, to fit it for farther working; but in the Female Regard is to be had to the Seed.

The Time of making the ſecond gathering is, for this Reaſon, determined by the ripening of the Seed on the Plants; and when gathered and bundled, theſe Bundles are to be ſet up in the Sun four or five Days, and then ſtacked up, that at a proper Time the Seed may be thraſhed out before they are fitted for farther Manufacture. It is the common Practice to raiſe this Hemp in Stacks, in ſome ſheltered Part of the Field, but as the Beginning of October is uſually a dripping Seaſon it is better to houſe it. A little Wet does it no Harm as to the main Article of the Stalk, but it may very eaſily get Damage in Reſpect of the Seed; and as the houſing it is eaſy 'tis much better to do it; the Owner then takeing his own Time to thraſh it.

The Caution we have given the Farmer about ordering Care to be taken that the Hemp that is to remain for the ſecond gathering, be not hurt in the firſt, will be eaſily ſeen to be worth his moſt ſerious Conſideration, when he comes to thraſhing his Female Hemp. From the Produce of an Acre of good Land he will get three Quarter of Seed, if he have followed the common Huſbandry in raiſing it; but if he have done it in the Horſehoeing Manner, he will have four or five Quarters, ſometimes more; the Plants in that Way branching out more, and bearing a much larger Quantity of Seed, and alſo ripening it better.

This, which is but an additional Conſideration, ſets the Female Hemp a great deal above the Male in Value, and at the ſame Time the Stalk of Hemp itſelf is much more valuable in the Female than in the Male.

CHAP. XXXV.

Of the watering of Hemp.

WHEN the Male Hemp is gathered nothing is to be done but drying it a little, before it is carried to the Water; to this Purpoſe the common Practice is to bundle it up at once, as it is pulled, and ſet the Bundles up on End till the Moiſture is ſomewhat evaporated.

This is all that can be conveniently done in the common Way of Huſbandry, becauſe there is no Ground for ſpreading it; but in the Horſehoeing Method, as there is Space between two and two of the Rows, it is beſt to throw it upon the Ground as it is pulled, and there let it lye a Day and Night; and after that to gather it up into Bundles.

This may be practiſed for the Female Hemp, in the common Way of Huſbandry. It is not an Article of any great Conſequence, but it is beſt to do it in both.

The Male Hemp, as ſoon as it is a little dried from the gathering, and the Female, after the thraſhing, are to be carried to the Water in their proper ſized Bundles. For this Purpoſe a large ſhallow Pond is beſt, and it ſhould have a firm Bottom: running Water would anſwer beſt, but it is not permitted any where to uſe it, for the Hemp infects it, deſtroys the Fiſh, and ſpoils every thing that is done with it.

Let the Farmer therefore who is raiſing Hemp take Care to have a Pond of proper Depth and Dimenſions ready, according to the Quantity of his Hemp.

He is to prepare for the Hemp by driving in half a dozen Stakes in a ſquare Form, very firmly into the Bottom. There the Hemp is to be brought and laid in, keeping it under Water; and the ſmall Ends of the Bundles are to be placed interchangeably, the thick Ends of one Bundle being laid one Way, and the thick Ends of the next another, and ſo with the whole Parcel.

In this Manner the Bundles are to be laid in one upon another, and the Water is to cover them all.

When the Bundles are all in there are to be Over-layers, as they call them, of Wood bound to the Stakes, to preſs them down, and keep them not only under the Water, but fixed from ſtirring about. Some cover the Square within the Stakes entirely with Over-layers of Wood; others only cover the Edges with theſe, throwing great Stones or other heavy Rubbiſh, to keep all under Water. Whichever Way the Hemp is kept conſtantly under, 'tis all one.

When it has lain thus five Days, one of the upper Bundles is to be taken out and waſhed in another Part of the Pond. In this waſhing the Farmer is to obſerve whether the Leaf comes freely off, for if it does the Hemp is watered enough; if not it muſt lie longer.

When it is watered enough, the Bundles are to be taken out one by one; and waſhed in other Parts of the Pond, that all the Leaves may be got off, and any Filth or other Matter that may by Accident be got among them, may

be discharged. This done the Business for watering and washing is over, the clean Stalks are to be set up an End, that the Wet may drain from them. When they are thus pretty well drained from the Water that hung about them, they are to be carried to some Place where they can be set up against a Wall or Pales, exposed to the South Sun, that they may thoroughly dry. This prepares it for the next Operation.

CHAP. XXXVI.

Of the braking of Hemp.

WHEN the Hemp has been cleared from Leaves and Filth, and dried from the washing, it is ready for the Brake. This is a wooden Instrument made with an Edge, and in all Respects like that used for Flax before described, but that it is larger and stronger. This is the Case with all the Instruments used in dressing of Hemp, they are the same in their Nature as well as Uses, with those employed in the dressing of Flax; but as this is a coarser Matter, they are larger, coarser, and stronger.

The Effect of this Dressing is, that the Bark or Rind of the Hemp is separated from the stringy Part of the Stalk, and that is broke and prepared for farther manufacturing.

The thorough drying of the Hemp is altogether necessary to the doing of this well, for otherwise the Bark will not separate, nór the Threads come to Pieces; and the Dryness of the Weather is a great Advantage in the same Respect, wherefore this should never be set about but in a favourable Time.

If the Season have been dripping, and the Hemp could not be got thoroughly dry by the Method already directed, it must be done by the Assistance of Fire: but there is great Caution necessary in this Respect, the Hemp so easily takes Fire in the drying. So many Accidents of this Kind have happened, in Places where Hemp dressing is carried on, that every one ought to be vastly upon his Guard who ventures on it; and if possible the Hemp should be dried without having Recourse to this dangerous Expedient.

In some Places they raise a Kind of Frame for this Purpose, which answers very well. They drive Stakes into the Ground at proper Distances, and lay Hurdles over them at five Feet from the Ground: they then spread the Hemp thin upon these Hurdles, and make a small Fire underneath. This requires good watching, but as a little Heat does for the Hemp it may be conducted without Danger. The Expence is trifling and it makes it work much the easier.

The Method of braking is the same in Hemp as in Flax, and the Purpose is also the same, the preparing it for farther dividing. It must be begun at the Root End, and so broke up to the Top; and the Person who brakes it must look into his Work at Times; the Design of braking it is, that the stringy Part of the Stalk may be all thoroughly crushed and loosened, when this is done, and it hangs in Shivers, it is enough; if otherwise it is to be broke more. Let not this be slighted: the whole Management of Hemp is very easy, but it must be conducted with Care; for a Mistake in this Respect can never be mended afterwards, without the greatest Difficulty, and often not without a great deal of Waste and Loss.

CHAP. XXXVII.

Of the dressing of Hemp.

IT would be natural to count the braking among the other Articles, in the manufactureing of Hemp under the common Head of dressing; but Custom establishes it otherwise, and we follow the usual Manner of speaking.

The braking of the Hemp being over, the next Operation is the swingling. As to the Article of braking, some perform it at once, which is the better Way, others go over it twice, this takes up Time, and with good Management is not needful. When the Hemp goes through this Operation twice the Brakes are of two Kinds, one coarser the other finer, and it is first broke in the one then in the other; but if a Brake of a middling Degree of Fineness be carefully used, once does it, and it will be fit for the Swingle without any more Trouble.

The swingling of Hemp, which is the first dressing after the Brake, is performed by two Instruments, a Block and a Dagger.

The Block is made of a single Deal raised four Foot above the Floor, and supported strongly to keep it steady; the Dagger is a wooden one, of the Form of a broad large Dagger, with a blunt Edge.

With this Dagger the Hemp is worked upon the Block, opening and beating it till all the knotty Pieces and Shivers are entirely broke, and the whole is perfectly smooth and even.

The Parcel of Hemp brought to the Brake together, is called a Strike: this they also bring to the Swingle together, and when they have sufficiently wrought it they strike a Fold or Twist in the Middle, which is the thickest Part, and so lay it by, proceeding with the rest till the whole Parcel is done.

This swingling is a very useful Operation, and it must be done carefully: the more so because it prepares the Commodity at once for the Market, if the Owner chuses to part with it in that Condition. For this Purpose he should observe, that there are two Things to be done in the swingling, the one is the breaking out the Lumps and Shivers, and the other is the softening of the thready Part, which is very well effected by the swingling, provided that be done carefully.

If the Owner chuse to part with his Hemp in the State just named, he has no more to do but carry it to Market; but he may more profitably prepare it farther. Every succeeding Operation is a getting it more and more ready for Cloth. The next to what we have already named, is a second swingling. This is done exactly in the same Manner as the first, and this works it still finer. The first swingling beat away the Lumps and softened the Teares, this second divides

vides the Threads finer, lays them ſmoother, and prepares it for heckling.

When the ſecond ſwingling is over, the Strikes are to be divided into Dozens and half Dozens, and ſo made up into great thick Rolls. Theſe are to be ſpitted upon long Sticks, and hung up in the Chimney, or in the Way of ſome other gentle Warmth. They muſt be dried in this Manner till there does not remain the leaſt Damp or Moiſture in them; and they are then fit for beating. This is to be done in a deep and ſtrong Trough, or upon a Block hollowed at the Top, and the Beetles muſt be large and heavy. By this Operation all the Threads are rendered fine, clean and tough.

When this is done the Stakes are to be divided, and all examined, to ſee if the whole be beaten enough; frequently ſome are not, and theſe muſt be beaten again.

When the Hemp has been thus twice ſwingled, carefully dried, and well beaten, it is to be brought to the Heckle. But this firſt Heckle muſt be coarſe, and with very open Teeth.

From this heckling there will come ſome coarſe Parts, which neither the ſwingling ſeparated nor the beating ſubdued, theſe are to be laid aſide, and the Hemp that has gone through this firſt coarſe Heckle is then to be worked in one that is finer. This prepares it for working into Cloth in the uſual Way: but when it is deſigned for Linnen of particular Fineneſs, there is ſome Difference to be made in the Management; and this may be worth the Farmer's Notice, whether he intend to work it into Cloth at Home, or deſign it only for Sale in the Strike or heckled State.

Two Dryings are very convenient on this Occaſion, that is, when it has been dried and beat, and once heckled, it is to be rolled up and dried over again, and the beating and heckling repeated in the ſame Manner, and after this the Heckles deſigned for Flax are to be uſed inſtead of thoſe for Hemp; theſe being coarſer and not ſo fit for the fine Work, even in Hemp, as thoſe intended for Flax.

This is the Management and Preparation of Hemp, from the ſowing the Seed to preparing it for ſpinning. The Owner may ſell it in the coarſer or finer Condition, but he will find it moſt profitable to continue the Dreſſing, in the Manner we have directed, to the ſpinning.

CHAP. XXXVIII.

Of the managing the Hurds.

WE have mentioned occaſionally more than once, the ſeparating the coarſer Part of the Hemp in dreſſing and rendering it finer. This coarſe and knotty Part thus ſeparated, is called the Hurds, it is not to be waſted; but being laid aſide in the dreſſing of the other, is afterwards to be managed by itſelf.

To be properly underſtood on this Head we muſt refer to ſome of the former Articles.

In the firſt ſwingling of the Hemp there will be ſeparated from the finer Part a great Quantity of Refuſe, with Tops, Knobs, and half broken Pieces and Lumps. All theſe muſt be ſhook up together, and carefully dried. When this is done they are to be thraſhed with Flails, and by this Means the Lumps will be broken, and they are to be laid by; they ſerve for many coarſe Purpoſes, though they would never have broke or divided well with the finer Stuff. Theſe, by Way of Diſtinction, are called the Swingle-tree Hurds; though any of the Refuſe may be beat up among them: a great Care of the Owner being, that nothing which can be put to any Uſe be waſted.

When the Farmer purſues his Intereſt by dreſſing the Hemp farther, there will be more Hurds ſeparated in the ſecond ſwingling, and they will be of a better Kind; theſe, managed by the Wool Cards, make what is called Hempen Harden. They are not to be mixed with the other Hurds, for they are much better, and ſell at a more advantageous Price.

In the ſame Manner every ſucceeding Operation for the dreſſing the Hemp ſeparates a Quantity of Hurds, though it be every time ſmaller and ſmaller. Theſe are all to be laid by as they come out. They do not require thraſhing with Flails, in the Manner of the coarſe firſt Hurds and Refuſe; but being well managed with the Cards, they make ſo many Sorts of ſaleable Stuff at different Prices.

CHAP. XXXIX.

Of Woad.

WOAD is a Plant of eaſy Culture, and as eaſy Management; ſubject to few Accidents, and of a ready Sale. 'Tis pity that it ſhould be cultivated in ſo few Places. One Recommendation it has in which it exceeds any Growth, this is, that it yields three, four, five, and ſometimes ſix Crops in a Year.

It is a large Plant, with great blueiſh green Leaves, branched Stalks, and Multitudes of ſmall Flowers, followed by little Pods with the Seed.

The Root is long and covered with Fibres. The Stalks are thick, round, and upright, and they divide at ſome Height from the Ground into ſeveral Branches.

The Leaves ſtand irregularly upon them, and many very large ones riſe directly from the Root.

The Flowers are of the Shape of thoſe of Turnips, and the Seed is oval.

The Flower is placed in a little Cup, conſiſting of four oval coloured Leaves: it conſiſts in like Manner of four Leaves diſpoſed croſswiſe. There riſe in the Middle ſix Filaments, four of theſe are of the Length of the Leaves of the Flower, and two are ſhorter; they have oblong Buttons on them, placed Sideways, in the Center of theſe ſtand the Rudiment of the Fruit. It is oblong, ſharp on both Sides, and is no higher than the two ſhort Filaments; the Flower and its Cup falling off this ripens, and contains only one Seed, which is lodged in the Center.

There are ſeveral Kinds of this Plant brought for Curioſity out of different Parts of the World, but only one is worth the Farmer's Notice, this is the common or broad leaved Woad, called Field

Field Woad. There is a Kind with ſmaller and narrower Leaves, diſtinguiſhed by the Name of Wild Woad, but it differs little from the other. The Seed of this is ſometimes, by Deſign or Accident, mixed with that of the right Sort, and of this the Farmer ſhould beware; the only Difference is, that this Seed is ſomewhat ſmaller than the right. It brings up a very good Woad, but not equal to the other.

CHAP. XL.

Of the proper Soil for Woad.

THE Farmer is not to be tempted by the Advantage attending any Crop, to engage in the raiſing it, if he have not the proper Requiſites; and the very firſt of theſe is a proper Soil.

There are Plants that will ſucceed only in ſome one Kind, but Woad gives him his Choice of two or three: it muſt be ſown however on one or other of theſe, or it will never anſwer. Therefore, though he has this Liberty, let him ſee that he does not exceed it. The two Articles in a Soil that favour the Growth of Woad are, that it be dry, and that it be rich. When theſe happen together the Soil is perfect for the Plant; but ſeparately they will do. Any warm and dry Soil will do, though it be but poor, but the better the richer; and in a rich Soil Woad will do, tho' not ſo perfectly dry as it muſt be in the other.

What this Plant affects moſt is a rich warm Loam; but as Richneſs and Dryneſs are what favour it, Cold and Wet together will never fail to deſtroy it.

Clayey Soils will never do. This is to be the great Caution; and the next is, that be the Soil what it will, the Woad will not ſucceed upon it unleſs very deep, if there be a clayey Bottom. This depends upon the ſame Principle with the other, the Hatred there is in this Plant to Cold and Wet; for Clay holds Wet and always makes a Soil cold when it lies near the Surface.

Now from theſe general Hints the Farmer may very well ſettle his Practice in all the needful Particulars. Firſt let him avoid all Clays and clayey Soils for Woad, and next, when he is about to ſow it on any other, let him examine the Depth and the Bottom.

Woad is a large Plant and requires a great deal of Nouriſhment, therefore it muſt have Quantity, that is, Depth of Soil, at any Rate; and particularly it muſt when there is a wrong Subſtance underneath.

Theſe are the Cautions as to what he is to avoid, the next Conſideration is what he is to chuſe.

If he have a ſandy Soil that is not bare and poor, but enriched with a large Quantity of good Mould among it; this is excellent, and the deeper the better. If he have a Piece of Ground that has a Soil of pure mellow Earth to a due Depth, this is better ſtill; and in particular if he have Opportunity of breaking up a Piece of Ground near ſome great Town, where there has been a Garden, this is very proper.

It is worth his while to be careful in this Choice, becauſe the Profits will anſwer accordingly. For on favourable Ground he will have one or perhaps two more Crops in a Year, than on ſuch as is but moderately right.

Woad, like all other Plants which require a great deal of Nouriſhment, ſucceeds beſt of all upon a Piece of Ground that is new broken up for it; and in this Caſe none anſwers like that which has once been in the Garden Way, and which has been mellowed by Dung and great Tillage.

If there be a Piece of gravelly Ground where there is not too great Abundance of large Pebbles, and a good deal of Loam among them, this will do excellently. I have ſeen Woad thrive very finely, where it has ſeemed to grow among bare Pebbles; but there has been good Stuff at the Bottom.

Any Piece of light Limeſtone Ground will alſo do for Woad, with the foregoing Reſtrictions, that it be not full of very large Pieces of Stone; and that there be ſome Goodneſs and ſome Depth in the Soil.

Of all Places in ENGLAND where I have ſeen Woad cultivated, the fineſt has been about THORNEY in NORTHAMPTONSHIRE. I had the Curioſity to examine the Soil in this Part of the Country, in ſeveral of their Fields, and found it all of one Kind, it was deep, rich, and of a blackiſh Colour; it conſiſted chiefly of mellow Earth, but with a large Proportion of a bright brown Sand.

What is more remarkable than any thing about this particular Soil is, that the Situation was low and ſubject to Wet. The Woad grows there in the Way of more Moiſture than I have ever ſeen it elſewhere, and yet ſurpaſſes all other in the Largeneſs and Fineneſs of the Leaf.

This is a particular Caſe, and I have inſerted it as ſuch, for the Sake of the Huſbandman who may chance to have Land of the Kind of this about THORNEY, but in general a ſomewhat hilly Situation is beſt, and a dry deep Soil.

We have obſerved that Woad ſucceeds beſt of all upon new broke up Land, and the ranker this is the better the Woad will thrive; it ſerves excellently to prepare ſuch Land as this for Crops of Corn, for which it would otherwiſe be too rich at firſt: but on all other Occaſions, as well as this, the Woad is to be removed after a Year or two. It exhauſts the Ground, and never ſucceeds well in the ſame Place long together.

The new Method of Huſbandry might remedy that Inconvenience, and perhaps with the Aſſiſtance of a moderate Quantity of enriching Manure, the ſame Piece of Ground might be made to bear Woad ever ſo long; but this we ſhall mention more at large hereafter: the common Practice of Huſbandmen is what we conſider in this Place; and that requires that the Crop ſhould be removed the third Year.

CHAP. XLI.

Of preparing the Ground for Woad.

WHEN the Farmer has fixed upon a proper Piece of Ground for this Growth, his next Care is to prepare it for the Reception of the Seed; for without this he may, after his beſt Choice, reap but a poor Advantage.

All Plants that draw a great deal of Nouriſhment, require that the Soil ſhould be well prepared for giving it. This Preparation is beſt given it by frequent Tillage; and a careful and repeated breaking and dividing, and occaſionally enriching of the Ground. As it requires a great deal of Nouriſhment, a Piece of rich Paſture Ground new broke up for that Purpoſe, is better than one in Tilth for Corn, and the Woad will leave it in a very good Condition for any other Crops.

The beſt Way of preparing ſuch a Piece is, by turning it up firſt with the four coultered Plow, which we have deſcribed before. This will cut and tear all the entangled Roots of the Graſs, and turn up the Mould to a very conſiderable Depth.

After this plowing it ſhould be harrowed carefully, and if the Seaſon and Soil be both dry, it ſhould be then rolled, and afterwards harrowed again.

This being done, the Lumps broke, and Refuſe of every Kind drawn off, there ſhould be People ſent on the Ground, to pick off the large Stones or any thing elſe that breaks in upon the Evenneſs and Fineneſs of the Ground, and has eſcaped the Teeth of the Harrow.

This is the Cuſtom in the Land that is moſt fit for Woad, that is, ſuch as is dry and warm: when it is a little moiſter the beſt Way is to plow it in high Ridges, and then the Pieces of Turf, and other Refuſe that lie upon the Surface, when picked off, may be thrown into the Furrows to rot.

Whichever Method be followed, the Land when finiſhed for ſowing, ought to lie as level, and be as free from Lumps, as the Border of a Garden. Land that has been fallowed ſome time does very well for Woad; and I have ſeen it thrive excellently on a broke up Piece of any of the artificial Graſſes: but in any of theſe Caſes the Preparation muſt be exactly the ſame, and the Reward will be ſuited to the Labour and the Care.

CHAP. XLII.

Of ſowing of Woad.

THE Preparation of Land for this Produce having been ſhewn, there remains to enquire into the Time and Manner of doing it. In each of theſe there is ſufficient Matter of Choice to the Huſbandman, for neither the common Manner of diſperſing the Seed, nor the common Time of doing it are ſo proper as what may be adviſed.

In the firſt Place the Farmer is to take Care that he buy good Seed, and that he have enough of it: he is not to count that Quantity ſufficient which will do to ſow the Ground he intends for this Purpoſe. Woad is very apt to fail, or to be deſtroyed early in its Growth, he muſt therefore have a Supply of Seed by him, to let in and make up the Deficiences. Having his Seed and his Land ready, he may ſow it in the common Way or by the Drill. In the firſt Method a Gallon of Seed is enough for an Acre, and in the Drill Method half that Quantity is ſufficient, for Woad is large in its Growth, and a few Plants are enough upon the Ground.

In the common Way of ſowing, the Seed is to be ſcattered as evenly as poſſible over the Ground, by the ſingle Caſt, and then harrowed in carefully. In the Drill Huſbandry it is to be ſown in double Rows, with ten Inch Partitions, and with five Foot Intervals between two and two.

Few Crops are more difficult to be well managed in the common Huſbandry; and none eaſier in the Drill and Horſehoeing Method. The Leaves alſo grow much larger, and are in themſelves much better this Way.

As to the Time the common Farmer errs as much as he does in the Manner of ſowing. The common Seaſon for this is the Middle of February, but the proper Time is the firſt Week in August. The Woad ripens its Seed in the End of July; Part of the Plants are to be reſerved for that Purpoſe; and the Seed never puſhes ſo ſtrongly as when ſown as ſoon as fit for it.

This is the Courſe of Nature; and it would be well if it were followed in more Things. We ſee the Seeds of Plants ripening in August and September, naturally fall to the Ground at that Time, or ſoon after, and they ſhoot in a few Days, their Leaves ſtand the Winter, and all that Time the Root is ſtrengthening itſelf in the Earth; ſo that when the Spring comes they are in a Condition to ſhoot with Strength and Vigour.

This being obſerved in Relation to Woad, the Growth will be much ſooner fit to cut for the firſt Crop, and every Way better. This firſt cutting will be the richer for the Time the Roots have been in the Ground, and the freſh Shoots will be the more vigorous for the next, it will come ten Days or a Fortnight earlier in the ſame Seaſon than it would have done in the Spring ſowing.

There is this farther Conſideration, the firſt Shoots of Woad are very apt to ſuffer by Inſects, in the Manner of Turnips and ſome others. It is for this Reaſon we have cautioned the Farmer always to have a Supply of Seed to make up Deficiences; but it is better to prevent them, and on this Occaſion the Autumnal ſowing is preferable.

When the Seed fails in ſome Part, and the Crop is ſupplied by freſh, this is a little backwarder than the firſt ſown; and when the Fly has deſtroyed a Part of the young Crop, and more is ſown, this laſt will be ſtill more backward in its Growth than in the former Inſtance. The Huſbandman would wiſh it ſhould be all equal, that it might come all to be cut together, but

but this is not to be obtained, unleſs theſe Evils be prevented inſtead of remedied.

This is not, in either Caſe, to be done without a Poſſibility of failing, but it may be made greatly more ſafe and certain by the Autumnal ſowing.

I can ſpeak from Experience, that the Seed ſown in Spring is, in this Kind, much more ſubject to fail than that in Autumn; and alſo that the Fly or Grub, ſo deſtructive of the young Growth, is much more frequent in the former than in the latter Seaſon.

As to the Goodneſs of the Seed, that depends in a great Meaſure on its being new. Seed ſown in FEBRUARY muſt be ſeven Months old, and it may be nineteen or twenty Months. And for this it is always the worſe in Proportion. It is a common Opinion among the Woadmen that two Year old Seed is as good as freſh, but nothing is more erroneous. They complain of bad Crops, and 'tis ſtrange they do not ſee into this, which is one principal Cauſe. I have made ſome of them try the Experiment, and the Difference has been this, that out of twenty new Seeds ſown, not above one, two, or three have failed; and out of as many old ones, eleven, twelve, or more; one would think this ſhould be convincing.

I have found in the ſame Manner by Tryals, that out of twenty Seeds of the ſame Crop, ſown in a Fortnight after their ripening, only two have failed; and out of twenty ſown from the ſame Parcel, the next FEBRUARY, four or five; this is as convincing an Argument as the other.

Theſe are Facts on which the Huſbandman may depend; let him therefore regulate his Buſineſs accordingly. Having thus laid down the beſt Method of ſowing this Crop, we ſhall proceed to inform the Huſbandman of the Way of managing it, whatever Practice he may have followed in ſowing.

CHAP. XLIII.

Of managing Woad in the Growth.

WE ſhall here direct the neceſſary Conduct for every Kind of Crop of Woad. We will ſuppoſe then firſt, that the Farmer have followed the old Method, and ſown his Land in FEBRUARY by hand. In this Caſe he will ſee it come up irregularly, and when it has been a Week above Ground, he muſt obſerve how it ſtands; if the Grub or Fly have been at Work, he muſt ſend in a careful Perſon with a Dib in his Hand, and a Parcel of Seed in his Apron. With the Dib he is to make Holes, and into each Hole he is to put five Seeds, this is to be done wherever the young Crop is ſeen to be thinned; and theſe Holes are to be a Foot aſunder.

If the Farmer will ſow his Woad in Spring, the earlier he does it the better. This Plant will ſhoot in very cold Weather, and the earlier the Seaſon the fewer there are of thoſe Inſects, the warm Showers of the more advanced Spring bring them on in Abundance.

When the Plants from this new ſowing have got to a little Size, the Field is to be hoed. This is not only to be done to keep down Weeds; but to thin the Crop itſelf, for the Plants muſt not ſtand ſo cloſe as they riſe in this random Way; if they do they will ſtarve one another. The Hoers muſt be careful Perſons; they muſt have Orders to thin the Plants to about a Foot aſunder; and they ſhould leave the ſtrongeſt and moſt promiſing. In this Manner they will be refreſhed as well as thinned; and having taken good Root, and the preſent Crop of Weeds being deſtroyed, they may be left to themſelves, for they will not ſuffer any more to riſe among them. In this Manner they may be left to make their neceſſary Growth.

In the ſecond Place let us examine the State of a Crop ſown the firſt Week in AUGUST. In this, if the Seed have been the Produce of that Year, and the Ground well prepared for it, there will be little or no Need of examining it on Account of Deficiences. The Ground will be too well covered to need a Supply; and the Flies will have little Power.

At a proper Growth, as in the former Inſtance, the Hoers are to be ſent in, and they muſt thin the Plants in the ſame Manner as the others, and thus leave them for the Winter. In that Time they will make but a moderate Progreſs above Ground, but they will be all the while ſtrengthening themſelves at the Root, which is the Owner's true Intereſt. They will be juſt ſtrong enough to keep down the poor Shoots of Weeds, that ſhew themſelves in that cold Seaſon, and they will ſhoot apace into Leaves in Spring, affording an early Crop, and a very fine one, and leaving the beſt Foundation that can be for the next, that is, Strength at Heart.

From what I have ſeen practiſed by ſome particular Woadmen, in this common Way, I ſhall be able to give the ordinary Farmer who purſues it, ſome uſeful Hints. If he ſend in his Hoers again in Spring, to break the Surface of the Ground, and deſtroy all the Weeds between the Plants, this Practice will greatly ſtrengthen and refreſh them. Not ſo much for the Injury ſuch a few poor ſtarved Weeds could have done, as for the Advantage there is in breaking the Ground.

This ſuperficial hoeing leads us naturally from the common Practice of raiſing Woad by the old Huſbandry, to the Method we have propoſed for doing it according to the new, and to the Advantages of deep hoeing about Plants of ſo large a Growth.

We have adviſed double Rows and five Foot Intervals, becauſe a third or middle Row would want Air, and therefore its Leaves would never come to their Freſhneſs and Colour; and becauſe the Land between double Rows ſhould have Opportunity of good turning.

We will now ſuppoſe a Farmer to have ventured on this Method, and ſhall not fear to promiſe him a three-fold Succeſs, to what it was poſſible he ſhould have obtained by any other. The Method he is to follow in the Management of his Crop is this.

When the Plants in his two Rows have got ſome Bigneſs, he muſt ſend in the Hoers with their Hand Hoes. Theſe muſt clear away all

the Weeds in the Partitions between the two where the Horſe Hoe cannot come; and they muſt thin the Plants in the Rows. They muſt leave one every fifteen Inches, or thereabouts; and theſe alternately, not oppoſite one to another.

This will reduce the Number of Plants on an Acre to very few, but the Profit will be ſo much the greater. The Benefit of Woad is not from the Seed but the Leaf; and Experience ſhews, that one ſingle and vigorous Plant will produce more than five that ſtand cloſe and ſtarve one another: and what is yet more to the Owner's Profit, one Leaf of this will be equal in Goodneſs to ten of the others.

When the Plants are thus thinned, and the Weeds cleared away in the Partitions, the Horſe Hoe is to be ſent into the Intervals, this is to plow deep and turn up the Soil, thoroughly deſtroying the Weeds, and preparing the Earth to ſupply abundant Nouriſhment to the Plants.

As often as Weeds riſe in the Intervals, this Horſehoeing is to be repeated; and it will be beſt to uſe it alſo at certain Times, for the Advantage of the Crop in particular States.

To underſtand this perfectly the Farmer muſt be led to conſider the Nature of the Woad: its Value is in the Leaf; and that conſiſts chiefly in its fine Colour and great Freſhneſs. The Woad draws Nouriſhment apace while the Leaves are young, and ſo continues till they get a good Growth; but toward the Time when they are to be cut, being large, they are not ſo fully ſupplied, partly becauſe they require more Nouriſhment; and partly becauſe the Ground is in a Condition to yield leſs. We have ſhewn the Occaſion of this before, namely, that all Ground, from the Time of its being broken and divided by Culture, grows worſe and worſe till it is tilled again. Therefore when Plants want moſt Nouriſhment, they can obtain leaſt; and this is particularly a Diſadvantage to Woad, becauſe its Value depends upon the Freſhneſs of the Leaf, which relies upon the Quantity of Nouriſhment it can get juſt at that Time.

For this Reaſon let the Farmer who raiſes Woad according to the new Method of Huſbandry, contrive his Horſehoeing ſo that one of them may come juſt before the full Growth of the Leaf for cutting.

There is a Time when the Leaves of Woad have acquired their Size, and want only their Fullneſs and Colour; at this Period let him bring in the Horſe Hoe between the double Rows. The Earth will by this turning be filled with Nouriſhment. The Ends of the Roots of the Woad will be cut off, and new ones will ſhoot from them into the new Earth: thus in two Days the Crop will acquire a new Aſpect of the true freſh green Colour; and if ten Days after this Horſehoeing it be cut, it will be in the utmoſt Perfection whereof it is capable; and the young Shoots that are to riſe for the ſucceeding Crop, will ſhoot with great Vigour immediately afterwards.

From this it appears plainly, that though a Crop of Woad may be every Way very advantageous to the Farmer; it can no Way bring him nearly ſo large a Profit as when it is raiſed by the Drill and Horſehoeing Huſbandry. This Practice is uſeful for all Plants, but moſt for the largeſt.

As to the other Method, thoſe who follow it ſtrictly will yet reap enough Advantage to encourage them to continue the Crop.

CHAP. XLIV.

Of the gathering of Woad.

WE left the Farmer in the laſt Chapter, with his Field of Woad ſufficiently ſtocked with Plants, and not over-burthened with them; and free from Weeds. They were in this Condition declared capable of over-powering the Weeds in the common Huſbandry, and proper Directions were given for deſtroying them by the Horſehoeing; therefore the Farmer had only to wait their Growth, for gathering his firſt Crop.

At what Time of the Year this ſhall happen cannot be well determined, for it differs greatly according to the Manner of Huſbandry, and the Time of ſowing; and alſo in ſome Degree in Reſpect of the Richneſs or Dryneſs of the Seaſon.

All that can be ſaid in this Reſpect is, that Woad ſown in Autumn will be fit for a firſt Cutting, earlier than that ſown in Spring; and that the Woad raiſed by the Drill and Horſehoeing Huſbandry will be ready to cut earlier, and yield the ſecond Crop quicker than that managed according to the vulgar Practice. For the reſt, as the Seaſon is better, the Crop will be the ſooner ready.

As warm and light Soils are moſt ſuitable to Woad, ſo a warm Sun and light Showers raiſe it the quickeſt to Maturity; therefore the Seaſon will often make ten Days, a Fortnight, or ſometimes more Difference in the ripening of a Crop of this Plant.

Let the Owner, when it comes near ripening, watch it carefully; for on finding the exact Time of this depends a great deal of the Advantage. When the Leaf is full ſized, firm to the Touch, juicy, and of a freſh and fine Green, it is ripe for gathering; and as ſoon as it is that ſhould be done.

Nature, in moſt Things, changes ſwiftly, from a State of Perfection to Decay; and in nothing more than this Growth. If the Time of Ripeneſs in the Leaf be not ſeized, it preſently begins to fade, it firſt grows flabby, and then loſes by Degrees its Colour.

This firſt Accident is very hurtful, but the other worſe. The letting Woad ſtand but three or four Days too long, will reduce a very good Crop to the Condition of a very middling one.

Therefore when the Leaf is ripe let it be inſtantly cut.

As ſoon as cut it is to be ſent to the Mill, and the Farmer is to prepare for his ſecond Crop.

We have obſerved that Woad yields ſeveral Crops in a Year. In the new Huſbandry the Aſſiſtance of the Horſe Hoe is ſo great, that theſe are all nearly of equal Value, and at the ſame Time there are more of them; but in the

common Husbandry every Crop is inferior to the first, both in Quantity and Goodness. The Woad of the first and second Crop are sometimes mixed together; but those which come after must be kept separate, or they will spoil; or at least much reduce the Value of the whole.

As to Quantity in the common Husbandry, an Acre usually yields a Tun of Woad, but in the Horsehoeing Method there is no Doubt of its yielding a much larger Store.

Woad will stand some time and yield successive Crops, but it is not adviseable to trust the old Roots too long, 'tis therefore to be renewed after the second Year, with all the Care that we have described as necessary at the first sowing: this is an Expence and Trouble it very well answers.

CHAP. XLV.

Of renewing a Field of Woad, and of obtaining the Seeds.

WE have mentioned the Necessity of renewing the Woad Field, and we have given the Farmer great Caution with Respect to the Choice of his Seed. These are Articles which naturally fall in with one another.

It is the Course of Nature in the generallity of Plants, that the large Leaves which rise immediately from the Root fade, when the Stalk grows up: therefore, as these Leaves are what the Farmer wants from this Use, he is not to encourage or suffer the Growth of a Stalk if he can help it, in the ordinary Course of the Crop: But when he wants Seed he must promote this Growth on certain Plants, that he may have it in sufficient Quantity for his future Occasions. This he is to provide for at the same Time that he renews his Crop for the usual Service.

We have shewn him the whole Manaagement of this Species, and we suppose him to have gone through the first Summer; what remains of the two Years Produce will be easily understood, as to its Use and Management.

When he has gathered the last Crop for the Summer, the Woad will continue growing. It will not rise to Leaves fit for the Common Service during the Winter, but what grow at that Season will not be useless. The Field will be a very rich, wholesome, and nourishing Food for Sheep, and their biting, far from doing any Harm, will prepare it for shooting stronger the next Spring.

After that it is to be managed exactly as the first Year, and the first Crops will be as good but not the following. The Owner will see toward Autumn, the Necessity of renewing his Plants, and he is to do it in this Manner.

When the last Summer's gathering is over, he is to plow up the Ground immediately for the receiving of fresh Seed, but in this he is to observe a particular Caution; for he is to leave a Part of the old Roots, they being to afford the Seed for the succeeding Crops. The rest of the old Roots are to be harrowed up and thrown away, and these being left, and having the full Advantage of the new plowed Ground, thrive at a surprising Rate, and yield the next Year such a Quantity of Seed that an Acre will sometimes yield fifty Quarters.

This will appear the more surprising when the Reader recollects what we have said in the Description of the Plant, that each Pod has in it only one Seed; but the Number of Pods upon a Plant is in a Manner incredible.

When the same Piece of Ground is to be in Woad for a considerable Time, this is the Method of managing it; but we advise the Farmer rather to observe the Caution we have first given, and not keep any Piece of Ground more than two Years in this Crop; for in that Time, if the Land were ever so rank, it will bring it down to be fit for Corn, and if continued longer will impoverish it entirely: there is no Land that can stand the exhausting of so large a Growth cut so often, except it be refreshed and kept in Heart by the Horsehoeing Husbandry.

In this Method the Intervals, while they are plowed up for receiving the Roots from the Rows, enjoy in other Respects a Kind of Fallow, and after two Years the new Crop may be sowed in the Center of each Interval, and the Places that first held the Rows become Intervals in their Turn, to prepare them for the Crop at the next Change.

If even this should not prove sufficient to keep the Ground in Heart for this rapacious Crop, some Dung may be used, plowing it in in the Intervals. It must be old mellow Dung for this Purpose; and by this Practice the Land may be kept in sufficient Heart for any thing. There is no Crop whatsoever that may not be supported, by this Management, ever so long upon the same Piece of Land, breaking the Intervals often and well, and burying mellow Dung in them at Times, and finally changing, at proper Periods, the Places of the Crops, making that the Middle of the Interval at one Time, which was the Place of the Rows at another. This is the Practice we advise the Farmer for every strong Crop.

CHAP. XLVI.

Of Weld, or Dyer's Weed, and its Difference from Woad.

BEFORE we enter upon an Account of this Plant, which may well enough be called a Weed, as it grows wild by Way Sides as well as in Fields where it is cultivated, it will be necessary to observe one very natural and very frequent Mistake that is made about it, as it is an Error that may be very prejudicial to the Farmer; this is, the confounding it with Woad. Its Name Weld sounding somewhat like Woad, has led some into this, and its Use in dying like Woad seems to have confirmed them in it; but notwithstanding this Resemblance in Name and Use, the Plants are altogether different, and the Culture that belongs to one does not suit the other.

What is the more dangerous in this Respect

is, that thoſe who have written to inform the Huſbandman, have too often fallen into the Error. Mr. Houghton, whoſe Collections on Huſbandry and Trade are much eſteemed, falls into this Miſtake: he confounds the two as if they were one Plant, and orders for Woad what thoſe from whom he learnt meant of Weld, and what muſt ruin the Huſbandman who ſhould depend upon it. This Account is to be found in his 381ſt Number of the ſecond Volume, where his Account and the Directions following it do not belong to either Woad or Weld, but are made up partly of what belongs to one, and partly of what belongs to the other.

This will ſhew the judicious Reader the Neceſſity of thoſe Deſcriptions we have prefixed to each of theſe Heads, of the Plant itſelf, they may have appeared at firſt Sight to ſome ſuperfluous, and to others too particular, but here is a Proof that they are in neither Fault; that nothing can be more wanted than proper Accounts of the Plants themſelves, before we enter upon their Culture; and that theſe cannot poſſibly be too punctual or exact. Where ſuch a Perſon as Mr. Houghton ſhould miſtake, how is the common Huſbandman to ſuppoſe he ſhall eſcape; eſpecially when he is deſirous of improving his Ground by ſome new Product. There is no other Way but by a perfect Knowledge of the Plant itſelf: he who had ſeen Weld and Woad treated of as diſtinct Articles, and had read an exact Deſcription of each, could never ſuppoſe them both to be one and the ſame Plant, or miſtake one for the other; for ſcarce any two Herbs are more different. It is in this, as in all other Reſpects with relation to Huſbandry, in order to practiſe it ſucceſsfully, the Perſon muſt underſtand it thoroughly. This is what we have attempted to inculcate throughout our whole Work, labouring to make the moſt ordinary Reader know the Grounds and Reaſons of every Thing he is to practiſe, and in every Article begin at the Foundation.

CHAP XLVII.

What Weld or Dyers Weed is.

THOUGH the Names may perplex the unexperienced Reader, none who has once ſeen Woad and Weld, can ever in his own Mind confound them together afterwards. We are to endeavour here to ſupply the Place of that Sight of the Plants themſelves by the Deſcriptions and Figures we have given, and are about to give of each.

Woad we have ſhewn is a large Plant with broad Leaves, covering a great deal of Ground: weld on the contrary, is an upright, ſlender, and tall Plant, ſpreading at the utmoſt over but a very few Inches.

It naturally grows wild on the Banks of Ditches, and is frequent in this State all over England. Culture makes no Alteration in it, ſo that he who knows it wild, cannot miſs it in the Field.

It is very upright, and ſcarce at all branched. The Root is white and fibrous, the Leaves that riſe from it are long and very narrow. They lie ſpread in a Circle upon the Ground, covering a Spot as big as a ſmall Plate; they are ſmooth, gloſſy, and of a pale but freſh green.

The Stalk riſes in the midſt of theſe, and has a great Number of Leaves upon it like thoſe of the Root, but ſmaller. From the Middle upwards, it is covered with Flowers, theſe are very ſmall and yellow, and they often ſtand in a kind of Spike of near two Foot long: after them come the Seeds, which are very ſmall, and are contained in open Seed Veſſels, a vaſt Number in each.

The Structure of the Flower and Seed Veſſel is this. Each Flower ſtands in a ſmall green Cup, formed of a ſingle Leaf, divided into four ſlender pointed Parts, two of which gape open more than the others.

The Flower is compoſed of three little yellow Leaves, placed one uppermoſt and two ſideways. The upper one is lightly divided into ſix Parts; the two ſide ones are each divided into three Parts in the ſame Manner. Sometimes there are beſide theſe three, two other ſmaller Leaves in the Flower: theſe are undivided, and ſtand at the Bottom, but many Flowers are without them. The upper Leaf is rounded at the Bottom, and has there a little Receptacle for a ſmall Drop of Honey Juice; this Receptacle is flattiſh, and ſtands erect juſt under the Leaf.

Within this Flower there are a Multitude of fine ſmall Threads, each having a little upright Button on its Top. In the Centre of theſe ſtands the Rudiment of the Fruit, or Seed Veſſel, this is rounded, and has three Points riſing from it of the Length of the Filaments. Theſe receive the Duſt from the Buttons at the Tops of thoſe Filaments, and convey it down from their Tops to the Embryo Seeds in the Rudiment.

When the Filaments and Leaves of the Flower are fallen off, this Rudiment remains in the Cup and grows larger, it becomes at laſt ridged and riſing; the three Points remain upon it, and it is open juſt at their Origin. The Seeds are numerous and very ſmall. When nearly examined, they are found to be of a Kidney Shape, and they grow to the Inſides of the Ridges of the Veſſel.

This is the Structure of the Flower and Fruit of this Plant, it was known to the Antients by the Name of Luteola, and in ſome Places we call it Would, which comes nearer the Name of Woad than the other. It ought therefore always to be called Dyers Weed, for the ſake of Diſtinction.

The Antients called it Luteola, which ſignifies the yellow Plant, either from its yellow Aſpect when in flower, or elſe for its Uſe in dying yellow, with which they were acquainted, and to which Purpoſe it is uſed at this Time; in this it differs from Woad, which does not afford a yellow but a blue Colour.

The Huſbandman can need no Advice as to what Kind he ſhall chuſe, for there is but one that deſerves his Notice. We have a little Sort of Dyers Weed wild in ſome Parts of England, but it is a trifling Plant, and not worth

Notice, the other is ſufficiently diſtinguiſhed from it by its Bigneſs.

CHAP: XLVIII.

Of the proper Soils for Dyers Weed.

NATURE points out the proper Soil for this Plant, and that is no ſmall Recommendation of it to the Huſbandman, for the ſame Obſervation ſhews, that a very poor one will do. We ſee the Plant wild, and we ſee it flouriſh in that State; and its general Situation is upon a Ditch, Bank, or other dry and poor Piece of Ground; often upon a Wall, and very frequently upon almoſt bare Sand, or entire Gravel. Nature therefore points out a poor, barren, dry Soil for the cultivating of it; and the Farmer who has Uſes enough for his beſt Land, will be very glad thus to know what to do with his worſt.

Weld will always grow upon this with very little Expence of dreſſing, and it is a Commodity of certain Sale to the Dyers, and of no mean Price.

Let the Huſbandman who intends to raiſe Weld, fix upon ſome poor, barren, ſandy Field, if he have ſuch a one; if not, let him chuſe the drieſt Piece of Ground he has, if it be better than needs, let him not grudge it to this Crop, for he will find a proportioned Advantage. The Weld will grow upon the pooreſt Ground, it will thrive better, and grow larger upon ſuch as is ſomewhat richer, provided it be of the right Kind.

I have obſerved ſeveral Pieces of Ground to the South Weſt of LONDON, where the Soil conſiſts only of Sand, and a black Mould; this is the beſt Ground that can be pitched upon to yield Dyers Weed in large Crops. It is a Sort of Land that requires a great deal of Manure to make it yield well in the common Way of Huſbandry, wherefore this would be a very great Improvement: ſuch Land will bear great Crops of this Plant from Year to Year, without any Expence of Manure, and with very little Culture.

In many Parts of HERTFORDSHIRE and BUCKINGHAMSHIRE, they have dry parching Gravels, which yield very little in the common Way of ſowing, and that at a very conſiderable Expence, theſe would bear Dyers Weed in great Plenty at ſmall Expence.

Theſe Soils, as alſo all poor Loams that are over ſandy and even, the Heath Land that lies dry will bear it; and in many Places Eſtates may be made by the Culture only of this trifling Article, for ſo it is in reſpect of the many others uſually ſown.

Now that we have ſhewn the Farmer the Advantage of raiſing Dyers Weed, we muſt caution him in one Reſpect; that is, that when he has found a proper Piece of Land for it, he examine whether there be a Purchaſer for the Commodity near him.

As much as this Plant is neglected, there is not any one whatſoever that is more fit to improve Eſtates in many Places, but it would be eaſy to overſtock the Market; and there are Places where there wants the Convenience of a ready and unexpenſive Sale.

Under theſe Conſiderations, few Things can be more advantageous than the cultivating this Plant, and nothing is more eaſy.

CHAP. XLIX.

Of the ſowing of Dyers Weed alone.

WE have obſerved that there needs no particular Preparation of the Land for the Reception of this Seed, but there is none that requires more particular Caution in the Sowing.

This may be done either alone or with ſome other Crop; and of theſe two Ways the firſt is preferable for very poor Soils, and the latter for ſuch as are ſomewhat better.

When a poor Piece of Land is to be ſown with Dyers Weed alone, nothing more is needful than Plowing, and once Harrowing. As to the Time of ſowing it, the Huſbandman may take his Choice of Spring and Autumn, but the Autumn is vaſtly preferable.

We have obſerved that the Seed is extreamly ſmall, therefore a vaſt Number goes to a ſmall Meaſure. This makes a little Seed by Meaſure ſuffice; but there is a great deal of Difficulty in ſcattering ſo ſmall and light a Seed tolerably equal over the Ground.

When the Land is ready, let the Huſbandman procure good Seed in the Quantity of a Gallon to every Acre. This is the uſual Allowance, and if properly diſtributed it is enough; the Number of Seeds being very great in this Quantity; but in all the Obſervations I have made, I never ſaw a Field that had any tolerable Regularity in this Reſpect.

The Farmers have a Cuſtom of mixing Duſt with the Seed before ſowing, to make it ſpread the more evenly, but this does not ſucceed. 'Tis ſcarce poſſible to ſow ſo ſmall a Seed by Hand alone, but the beſt Crops ſhew how imperfectly this Practice anſwers the Purpoſe.

We have before us at this Time, a Letter from a very ingenious Correſpondent on this Subject, which propoſes a great Improvement founded upon the Principles of Reaſon, and eſtabliſhed by Experience. We thank this Gentleman in the Name of the Publick, and wiſh for the Sake of Mankind, he would extend his Obſervations to more Subjects, and that others would follow the ſame uſeful Steps, we ſhould then ſee Huſbandry appear with a new Luſtre.

To the AUTHORS of the BODY of HUSBANDRY.

GENTLEMEN,

" Permit me to give you the moſt eſſential
" Proof of my Regard for your Undertaking,
" by contributing my Mite toward the publick
" Benefit. What I have to relate to you re-
" gards a ſingle Article, and one uſually e-
" ſteemed but inconſiderable; but it is one
" which I am ſufficiently certain might, with

" proper

" proper Management enrich many a Land-
" owner or Farmer.

" The Plant I mean is Dyer's Weed, and
" what I have obſerved and practiſed concerning
" it as follows.

" Obſerving that the pooreſt Places abounded
" with this Weed, I reſolved to try a Crop of
" it upon a Piece of Land I had, that ſcarce
" yielded me any thing; and not having an Op-
" portunity of buying the Seed, I ordered a La-
" bourer to gather it for me from the Banks,
" and other waſte Places, when ripe.

" I am ſituated about eight Miles from the
" Sea, in the County of Essex. I went with
" my Labourer to ſhew him the ripe Plants,
" and ſee he made no Miſtakes; and thus
" had an Opportunity of obſerving the natural
" Growth of this Plant in different Places.

" I found this Particular, that upon the ſame
" Soil, and under all the ſame Accidents, the
" Plants were larger and finer between me and
" the Sea, for two or three Miles, than they
" were on the other Side.

" You will perhaps think it Fancy, and ima-
" gine that the Sea can have no Effect on the
" Growth of a Plant, at five or ſix Miles di-
" ſtance; but having ſtudied Botany in my
" younger Time, to me there was nothing won-
" derful in this, though I ſoon determined to
" make the Diſcovery uſeful. There are on
" the Side of my Eſtate, for the little Land I
" cultivate is my own, that is next the Sea, ſe-
" veral Sorts of Trefoil that are not found on
" the other Side, though the Soil be the ſame;
" and I have obſerved that ſeveral wild Herbs,
" which will not grow within the Reach of ab-
" ſolute Salt Water, yet either grow in no other
" Places than ſuch as are four, five, or ſix
" Miles diſtant from the Sea; or no where ſo
" thrivingly.

" From theſe Obſervations, made at a Time
" when I little thought they would be uſeful, it
" appeared no Wonder to me that Dyers Weed
" ſhould thrive better within this remote In-
" fluence of the Sea, than elſewhere, though it
" grows naturally in all Parts of the King-
" dom.

" Upon this Obſervation, and the Practice of
" our Farmers, of mixing dry Road Dirt among
" the Seed of Dyers Weed, to make it ſpread
" more equally in ſowing, I founded the follow-
" ing Practice, which anſwered my utmoſt Ex-
" pectations, and which is the Occaſion of this
" Letter.

" Having got together a good Quantity of
" Seed, I ſpread it on the Floor of a Garret to
" Air, and in the mean while ordered my bad
" Piece of Land to be twice plowed and har-
" rowed very even. It is one of thoſe brown
" duſty Soils that we ſee on the Heaths of Sus-
" sex.

" Having meaſured out five Gallons of Seed,
" for my Piece is near five Acres, and this is
" the common Allowance; I ordered ſome fine
" ſmall red Sand that lies upon our Coaſt, to
" be brought in wet from the Sea, being pared
" away juſt where the Tide was run off. I
" ſpread this to dry a little in the ſame Garret,
" and when it would juſt break I meaſured two
" Buſhels and a half of it to my five Gallons
" of Seed; I ſaw theſe well mixed with a ſmall
" wooden Scoop, and then ordered them to be
" ſown. This was the ſecond Week in August.
" The Seed came up very regularly and ſtrong,
" the lower Leaves ſtood the Winter, and in
" Spring the Stalks ſhot up; I had my Dyers
" Weed ripe three Weeks before my Neigh-
" bours; and by the concurrent Teſtimony of
" all who underſtood it, I had twice as much as
" ever was raiſed upon an equal Piece of Ground,
" in the Memory of Man.

" This great Advantage I attribute to ſeveral
" Cauſes, all owing to the Mixture of the Sand
" with the Seed; but having related to you the
" Fact, which is the uſeful Part, I ſhall be ſhort
" upon the reſt. In the firſt Place my Piece of
" Ground was a barren Earth, therefore the Ad-
" dition of the Sea Sand enriched it; for though
" but ſmall in Quantity, the ſpreading it even
" was a great Advantage.

" In the next Place the Soil was rendered
" ſomewhat lighter and warmer than before,
" both which Qualities fitted it the better for
" this Plant.

" Thirdly, The Seed was by this Means very
" evenly diſtributed over the Ground, for by
" ſowing it by hand in a careful Manner, where
" freſh mixed; and before the Sand was tho-
" roughly dry the Seeds ſtuck to one or other
" of the Grains of Sand, and the Weight of the
" one carried the other along with it; whereas
" in the common Way of mixing the Seed of
" this Plant with dry Duſt, the Duſt goes one
" Way and the Seed another; and though the
" Duſt be very evenly ſprinkled, the Seed is
" not.

" But laſtly, the great Aſſiſtance of all I at-
" tribute to the Salt hanging about the Sea
" Sand. I doubt not but you very well know
" how rich an Improvement Sea Sand is to
" Land, and how vaſtly preferable to that of
" Pit or Rivers: in this Caſe every thing con-
" curs to make it take the fulleſt Effect. The
" Improvement it makes in the Soil is what ex-
" actly ſuits it to the Crop; the Richneſs it
" gives is conveyed directly to the Plant in its
" firſt Shoot, the Sand being ſown with it; and
" finally here is the Advantage of that little
" Saltneſs, which ſo well agrees with this par-
" ticular Plant, conveyed to Land which lies
" too remote for the Influence of the Sea.

" Whatever you determine concerning my
" Reaſonings, the Facts are certain, and they
" are ſufficient. I hope to ſee the Improvement
" communicated to the World by your Means,
" and practiſed wherever there is a proper Land
" for this Growth, and Sea Sand within a pro-
" per Diſtance.

" I wiſh your Endeavours the Succeſs they
" deſerve, and am with Reſpect,

Your humble Servant,

Chriſtopher Hawkins.

We can add nothing to this Account of the beſt Method that ever was invented for ſowing of Dyer's Weed alone, but ſhall proceed to the Way of ſowing it with another Crop.

CHAP. L.

Of ſowing Dyers Weed with another Crop.

AS the ſecond Year is the Time at which the Dyers Weed comes to its Perfection, it may very well be ſown with another Crop to ſave Trouble; the ſmall Advance it makes under the Shade of that more ſpeedy Growth, during its Continuance on the Ground, being ſufficient to give it Strength in the Root for the enſuing Year.

Some Trouble and ſome Charge are ſaved by this Management, therefore many will chuſe it; and theſe are to be informed that there are only two Crops proper for its being ſown with, theſe are Barley and Oats: in either of theſe Caſes the Seed is to be mixed in the Proportion of a Gallon to an Acre, with the Seed Corn of either Kind; and when ſown together with that it is to be rolled into the Ground. It will ſhoot up ſoon after the Corn, and will continue alive among it, though with a weak Aſpect.

As it now only ſends up the Leaves from the Root, and they lie naturally ſpread upon the Ground, and will bear trampling, it will get no Harm from the neceſſary treading down in the Harveſt, nor from the Inſtruments uſed in that Employment.

All this Time it has ſtood juſt alive, but as the Roots of the Stubble decay, and there is no other Growth to exhauſt the Nouriſhment from the Ground, it will, having Air and Food, begin to ſtrengthen itſelf and acquire a Look of Health and Vigour. In this Condition it will ſtand thro' the Winter, and then it will ſhoot up in Spring and preſently come to a fine and rich Growth.

In this Caſe, as in the Method of ſowing alone, the Difficulty is to ſcatter the Seed equally over the Field. This is not done by mixing it ever ſo evenly among the Seed Grain, becauſe the Weight of the Grain throws it forward, according to the Direction of the Hand, but this light Seed does not keep it Company. For this Reaſon I ſhould be for uſing the ingenious Method of our Correſpondent, even in this Caſe, only mixing the Sand in about half the Proportion which he allows for the ſowing of it alone. This will have the ſame Effect of ſpreading it equally, and, far from injuring, will be an Advantage to the Corn; the Quantity of Salt Sand, though ſmall, yet being enough to do ſome Service in the Way of a Manure. This is the beſt Method of ſowing Dyers Weed with another Crop, but however ſome may pleaſe themſelves with the Fancy of the Money they ſave by it, the other is greatly preferable.

CHAP. LI.

Of the Management of a Crop of Dyers Weed in growing.

WE have ſaid leſs Trouble is required for this than moſt Crops, but of the little that is needful nothing ſhould be omitted. We have ſhewn how little Preparation of the Ground is neceſſary for the ſowing this Plant alone, and having delivered the beſt Method ever invented of raiſing it in this Manner, we are to conſider it as it riſes, and in its Growth.

If the Seaſon prove dry the Seed will be ſome time in the Ground before it makes any Appearance, but after a little Rain it ſhoots up, and the Leaves are of a pretty Green.

When the Leaves are of ſome Bigneſs, and ſpread with Strength, Hoers are to be ſent into the Ground: they are not only to cut up the Weeds that riſe among the Plants, but to thin the Plants themſelves. In this Caution is to be uſed: the Shoots will be too thick in many Places, but 'tis to be remembered, that this is an upright Plant with few Branches, it may therefore ſtand much cloſer than others.

About nine Inches Diſtance is ſufficient for theſe Plants, and if on any Part they are thinner by the irregular Diſtribution of the Seed, it will be proper to thin them to that in other Parts, by pulling up inſtead of cutting away the Plants, and ſo tranſplanting as many of them as are wanted.

When the Field is thus left properly ſtocked with the Plants, it is to remain untouched during Winter: in Spring the Owner ſhould go over it, and if it be a poor Soil he will probably find little or no Occaſion for more Trouble; but if a rich one, Weeds will naturally be grown up in it, and in this Caſe it muſt be hoed again. This is done at a ſmall Charge, and is very well worth while, it ſo happily and perfectly provides for the Growth of the Crop.

After this the Dyers Weed is to be left to itſelf till the Time of gathering. The Strength it has got at the Root in the Autumn, and during the Spring, will be ſhewn in the Shoot at this Time; and no Weeds will be able to live near it. From this Time it will ſhoot up very faſt and if ſome warm Rains fall as the Stalk is riſing, they will add greatly to its Height.

CHAP. LII.

Of the gathering of Dyers Weed.

THIS is one of thoſe Crops that is to be gathered by pulling: the Roots are of no Service after the Stalk has riſen, and conſequently the Method is to tear it up by them. This is to be done in the ſame Manner as the pulling of Flax, but with more Care on Account of the Seed. We have obſerved, in the Deſcription of the Plant, that the Seed Veſſels are naturally open, ſo that this is eaſily ſcattered and loſt: the more as it is ſo extreamly ſmall; and this the Owner is to guard againſt as much as poſſible, becauſe of its Price; the Seed in this Crop being no little Addition to its Value. Though very ſmall it is produced in a prodigious Quantity; every Stalk being half Way down covered with Seed Veſſels, and theſe quite full of Seed, and its Price, one Year with another, being ten or twelve Shillings a Buſhel.

For the saving of this not only a great deal of Care is to be taken in the pulling up the Plant, but the proper Time for that Operation must be watched strictly. This also is necessary on Account of the Herb itself, and its Use to the Dyer.

There is a Degree of Ripeness at which it is perfectly suited to his Purpose; before that Period it is unripe, and immediately after it changes greatly for the worse, by a beginning Deadness and Decay. Happily for the Farmer this Period of Ripeness of the Stalk is exactly that of the Seed, but he must therefore be doubly careful to watch when it arrives, and seize upon it.

When the Stalk is ripe for the Dyer the Seed has its full Growth and Maturity. It requires only to dry and harden a little, and this may as well be done out of the Ground as in.

To find this exact Season for pulling the Crop, the Owner is to watch the Colour and Aspect of the Stalk, and of the Spike of Flowers.

The Stalk is at first of a faint Green, but when it ripens for Use it grows yellowish; this is the first Signal of its being growing ready for pulling. When this is perceived let the Farmer examine the long Spikes of Flowers and Seeds. The whole Field generally ripens very regularly, so that judging by two or three there will be no great Danger of Error. If there be many Flowers on the Spike downwards, and the Seed Vessels at the lower Part be green and soft, 'tis not yet ready; but by Degrees these Seed Vessels toward the Bottom of the Spike grow hard, and there are only a few Flowers toward the Top of the Plant, and then the Season of gathering approaches. If there have been Wet there will continue new Flowers shooting after the Vessels harden, but these are not to be regarded; the proper and precise Time is when there are a very few Flowers, and those only at the Top, and when the lowest Seed Vessels are hardened, and have the Seed loose in them, and the rest are hardening. This is the proper Ripeness of the Dyers Weed; the Stalks never fail to grow yellowish at the same Time. When the Weather is fair this Condition of the whole Plant comes on very regularly and very favourably; and the Farmer who watches it from the first Appearance to the last, cannot fail of knowing it exactly.

When the Crop is thus ripe the Pullers must immediately be sent into the Field, with Orders to get it all up with Expedition. The Cautions to be given them, if unused to this Crop, are these, they are to draw it up as upright and with as little shaking as possible; and then keeping it still upright they must tie it into small Bundles, and set them up to dry.

There would require Difficulty and Trouble to get up the Plants in this Manner, if pulled before Ripeness; but when the proper Period is observed, the Seed being ripened, the Roots are of little farther Service, their small Fibres rot off, they lose their firm Hold of the Ground, and come up with great Ease.

When this Herb is dry it is fit for Sale, but the Seed is of no Use to the Dyer, nor would at all add to the Value in his Eye. Therefore the Farmer is to take Care to get it out for his own Supply, and for Market.

To this Purpose, when the Handfuls have stood to dry a little in the Sun, he is to have them housed; and after a little Time he is to examine and see if the Seed be all hardened. When it is he must throw the Bundles on a Floor and thrash them lightly, to separate the Seed. A very little Violence answers this Purpose. Shaking alone would very nearly do it. When the Seed is out it is to be left on the Floor three or four Days, to dry and harden more perfectly, that it may not be in Danger of damaging by keeping; and then is to be swept up and cleaned.

The whole Herb is to be sold to the Dyers, and it is ready for them as soon as thrashed. The Seed is to be sold, reserving a sufficient Quantity for the succeeding Crop, and this is to be sown as soon as it is thoroughly dried. Two good plowings and one harrowing will prepare the same Ground for it again; and thus two or three Crops may very well be raised without Expence. After this it is better to change the Crop than manure the Ground, for Dyers Weed is one of those Plants that do not like Dung.

CHAP. LIV.

Of Coleseed.

THIS is a Produce confined, in a Manner, to a few Parts of the Kingdom, but that might very well be carried to others. We shall shew the Profits to the Husbandman in general, and if we can tempt him to cultivate the Plant, shall not leave him deficient in any Article regarding the Management.

There is the less Reason to wonder that Coleseed, so profitable in some Parts of the Kingdom, is so little raised in others, for this, that the Plant itself is less known than any other among the whole Number of those cultivated for Use. To ask what Herb it is that yields this Seed, is a Question that would puzzle many beside the Farmer. Even its Name is not commonly known. Coleseed is the Name of the Seed only, it is also called Rape Seed, but this does not lead to the Matter; Cole is not the Name of any Plant, and Rape signifies Turnip: we shall explain this Matter, and before we enter upon the Culture shew the Farmer what the Herb properly is that he is to cultivate.

Coleseed is very well known in LINCOLNSHIRE, and some other Counties; and Rape Oil is as well known, which is made from it.

The Seed is known at the Shops, and the Plant by the Farmers who raise it: but nothing more. In some Places the Seed is sown among the other Kinds of what are called young Salleting; but in this Case, as the first Leaves only are eaten, no more is seen of it.

All the Time that this Ignorance remains about the Form of a very useful Plant, it is common wild on our Ditch Banks, and there needs nothing more than to shew its Seed to the LINCOLNSHIRE Farmer, for him to say that is it.

These

Theſe are the Inaccuracies and Errors which ſo greatly retard the Progreſs of Improvements in Huſbandry. The Articles are themſelves unknown to thoſe who ſhould be the Authors of thoſe Amendments.

The Price of Coleſeed, if the Farmer chuſes to ſell it in that Condition, is very conſiderable, reckoning the Quantity an Acre yields; and if he will be at the Trouble of drawing the Oil, the Method of doing it is very eaſy, and his Profit vaſtly greater. Nor are theſe all the Advantages he receives from the Growth of this Plant: it is like the Dyers Weed in this, that it will grow on Soils which will not yield any thing elſe to Advantage; and though theſe are of a very different Kind from thoſe peculiar to the Dyers Weed, that flouriſhing on the moſt dry, and this beſt on marſhy Grounds; yet there are enough of theſe laſt in many Parts of the Kingdom, to ſhew how advantageous it muſt be to the Nation, to render the Plant more known, and the Culture of it among our Farmers more univerſal.

CHAP. LIV.

Of the Coleſeed Plant.

THERE is no other Name by which we can treat of this intelligibly to the Farmer, than this form'd from the Seed: what Herb it is that is thus called in the Coleſeed Countries, or what is the Plant that yields Coleſeed, we are about to ſhew.

There are three Kinds of Plants, each containing ſeveral Species, and diſtinguiſhed by different Names, but very nearly agreeing in their Flowers, Seed Veſſels, and other general Circumſtances; theſe are, 1. The Cabbage Kind. 2. The Turnip Kind; and 3. The Navew Kind. The Confuſion that has been made among theſe, has been one Occaſion of the Uncertainty about the Coleſeed Plant.

The Root of the Turnip Kind, and the Stalk of the Cabbage Kind, are what principally diſtinguiſh them; as to the Navew it differs very little from the Turnip, and that principally in the Smallneſs and Length of the Root.

The Flowers of all theſe are alike, and the Seeds of them all reſemble one another, and they will all, in the ſame Manner, yield that Oil which we call Rape Oil; but there is one Kind that yields it in greater Quantity than the others. This is the wild Navew, called Napus Sylveſtris by Authors, and this is the proper Coleſeed Plant.

The Turnip and Cabbage Kind we have in our Gardens in great Variety, and ſome have for Curioſity introduced the Garden Navew, or Napus Sativus, but it is inferior to the Turnip, and therefore little regarded. The Authors who figure and deſcribe the Garden Navew, figure alſo a wild Kind, and this is what we have on the Banks of Ditches. We have obſerved that the Navew differs little from the Turnip, except in the Shape and Bigneſs of the Root; and this Plant, which otherwiſe much reſembles the Turnip Kind, yet is properly a Navew, becauſe it has a very ſmall Root.

This is the wild Napus, whoſe Seeds are preſcribed in Medicines; and it would be better the Apothecaries gathered them from the Fields, or bought them under their proper Name at the Shops, than uſe Turnip Seed, as is the uſual Cuſtom, in their Stead.

We generally receive the Seed from HOLLAND or FLANDERS, and I have ſeen that the Seed from different Places is not all of the ſame Kind. I have obſerved a Field of the yellow Turnip raiſed from Coleſeed, brought from FLANDERS; and another of a particular Plant of the Cabbage Kind, raiſed from Seed from HOLLAND. Theſe were equally called Coleſeed, and they anſwered the Purpoſe; the Seeds were ſmaller in the firſt, and duſkyer in the latter, than thoſe of the wild Navew or right Coleſeed Plant, but they each yielded a good Quantity of Oil.

Any of theſe Kinds therefore will anſwer under the Farmer's Hands, but as the wild Navew yields much the finer Seed, and much the larger Quantity of it, and that is alſo richeſt in Oil; 'tis beſt to cultivate that particular Kind. This is oftener to be had from HOLLAND than any where elſe, and we ſhall inform the Purchaſer how he is to know it by the Eye.

The proper Coleſeed Plant, or wild Navew, is four Foot high, and of an irregular Growth. The Root is long, ſlender, and white, 'tis of a ſweet Taſte like a Turnip, but with ſomewhat more Warmth. The lower Leaves are long, large, deeply divided at the Edges, and of a duſky Green. One Stalk uſually riſes in the Midſt of theſe, ſometimes two or more. This is round, ſmooth, of a pale Green Colour, and divided into many Branches toward the upper Part. The Leaves upon this ſtand one by one, not in Pairs, they are ſmaller and narrower than thoſe from the Root, and are of a paler Colour. The Flowers grow at the Tops of all the Branches, they are ſmall, of a bright Yellow, and perfectly reſemble thoſe of the Turnip: after theſe come Pods, which contain the Seed. This reſembles Turnip Seed, but that it is larger and ſmoother. The common Appearance of the Plant in Summer, is with long Spikes of Pods, and a few Flowers at the Top of each.

This is the Appearance of the wild Navew in our Fields and on Banks. When it is cultivated for Coleſeed it grows ſomewhat taller and more branched, otherwiſe there is no Difference; and in good Ground the Root will be larger and more tender. There is no Difference between this wild Navew and the Garden Navew, except that the Root of the Garden Kind is yet tenderer and thicker; but this is principally while it has only the lower Leaves, for when it is ſuffered to run to Seed the Root grows ſticky in the Garden. Indeed there ſeems no other Difference between the Garden and the wild Navew, but what is made by Culture.

The Flowers and Fructification of the Coleſeed Plant, when nicely examined, are thus formed. The Flowers ſtand in a Cup compoſed of four little oval pointed green Leaves, and this does not remain after the Flower is faded, as in the Dyers Weed, but periſhes and falls off with it.

it. The Flower is compoſed of four plain narrow yellow Leaves, placed croſswiſe. Theſe are broadeſt at the Ends, and not at all divided; they are of the ſame Length with the Leaves of the Cup. In the Centre of this Flower riſe ſix Filaments, four of theſe are conſiderably longer than the other two: they have ſmall pointed Buttons growing on them. In the Centre of theſe riſes a ſmall upright Body, which is the Rudiment of the Seed Veſſel; this has a Kind of Button at its Top, in which there are ſmall Openings for receiving the fine Duſt out of the Heads of the Filaments; for in propagating the Seed, when the Leaves and Cup of the Flower are fallen, this Part enlarges, and at length becomes a Seed Veſſel of a longiſh depreſſed Shape, divided in the Inſide by a Membrane, which ſhews itſelf beyond its Extremity, and containing ſeveral large, round, bright Seeds.

This is the Conſtruction of the Flower and Fruit of the Coleſeed Plant, the proper Name of which is wild Navew, and which grow naturally wild, not only in England but in Flanders, and other Parts of Europe.

The Seeds of the natural wild Plant may be gathered and ſown; but thoſe from ſuch as has been cultivated raiſe the ſtouteſt Plants, theſe therefore the Farmer is to chuſe, according to the following Marks.

CHAP. LV.

Of the Choice of the Seed.

WE would have the compleat Huſbandman not only introduce every Crop that can be profitable upon his Land, but would have him manage every Kind in the moſt profitable Manner. When a common Way of conducting himſelf will bring an ordinary Profit, we mean to ſtir up his Induſtry to new Methods by propoſing a much larger Advantage. This is the Caſe in nothing more eminently than the preſent Inſtance. Coleſeed is a very advantageous Growth, to the Farmer who takes leaſt Care or Pains to underſtand or manage it. But to him who will ſet about it on our Principles, it will yield a much greater.

We ſhall begin with the Seed, for without a due Care in the Choice of this all the ſucceeding Labour will come to little; now this is an Article in which Miſtakes are frequent.

We have obſerved that there are ſeveral Kinds of Coleſeed. Of theſe one is the right and proper Sort, and is in all Reſpects preferable to the others. Let the Farmer therefore be ſure that he knows, and next take Care that he chuſes this. The Seed of the Navew is this right and proper Kind; it is very large, ſmooth, and of a fine bright Colour. Let the Farmer keep theſe Marks in his Remembrance, and then examine ſeveral Parcels of Seed together, to ſee to which they beſt anſwer. All the Seeds ſold under the Name of Coleſeed reſemble one another, but the worſer Kinds are either ſmaller or of a duſkyer Colour, and leſs ſmooth Surface. 'Tis eaſy to be deceived, till they have been once ſeen together: but after this the right Kind will always be known by Sight, and the careful Huſbandman will be in no Danger of miſtaking any other for it.

The next Thing to being ſure of the right Kind, is taking Care it be in a right Condition. Coleſeed is a particular Seed, and is much eaſier damaged than Corn. It conſiſts of a great deal of ſoft pulpy Matter, under a thin Shell or Cruſt, therefore it is naturally moiſt. If it be not carefully kept it will grow damp, and this is a certain Deſtruction to it. Therefore let the Huſbandman take Care that he buys dry Seed, and ſuch as has been always kept dry; not what has been damp and dried again. He will know this by the Colour and the Smell. No Seed is ſo apt to damage by this Accident of Moiſture, and in this Caſe it gets a raw muſty Smell, which never goes off entirely, though it be ever ſo well dried afterwards. Alſo as ſoon as it becomes damp enough to be damaged, it loſes the fine bright Colour on the Outſide, and this it never recovers again perfectly.

Therefore the Sweetneſs and Brightneſs of the Seed are great Marks of its being in good Order; and if the Huſbandman keep this in his Mind, and be careful in the Choice, he will rarely be deceived.

The next Thing to the buying it dry is the keeping it ſo, if there be any Time between the Purchaſe and the ſowing of it; for as this Seed eaſily receives Damage, it receives it alſo very quickly. The beſt Method, as ſoon as the Seed is bought, if the Ground be not entirely ready for it, is to ſpread it on the Floor of a dry airy Garret. This not only will preſerve it from Damage, but it is an Improvement upon the common Method of keeping it; and will make it ſucceed much the better.

Next to the Choice and Preſervation of the Seed, we are to adviſe the Huſbandman to take Care whence he has it. Although the Plant is equally a Native of England and Flanders, yet it thrives more in the latter Place, and ripens its Seeds better; ſo that they are more perfect and are fit for the Production of the ſtrongeſt and largeſt Plants. Flemish Seed is always to be had; and it will be always to the Farmer's Advantage to get it.

The People in Lincolnshire and Northamptonshire, commonly ſow the Produce of their own Crop, but this from time to time dwindles; and there is no Compariſon between a Field of Coleſeed raiſed from ſuch Seed, and one from Flemish or Dutch Seed, other Circumſtances being equal.

While the Farmer gives the Preference to foreign Seed, let him take Care that he do not fall into another Error, that is, let him ſee it be not old.

All Seeds ſhoot the quicker and the ſtronger for being new; and none ſhews the Difference more than Coleſeed. I have ſeen the Experiment tried by Mr. Greſtone, who for Curioſity ſowed the Seeds of ſeveral of his own ſucceſſive Crops, and tried them in a Piece of Garden Ground near one another. The laſt Years Seed was up five Days before ſome of the old, and above a Week before others; and the

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Number of Plants from the ſame Quantity was alſo greater.

Theſe are very material Conſiderations. The Newneſs of the Seed in this Kind, may always be known by the Clearneſs of the Colour. 'Tis always impaired in this Character, when it has been kept any conſiderable Time.

Let the Huſbandman get a Quantity of this good and perfect Seed from Abroad for his firſt Attempt, and he may if he pleaſes ſow the Produce of that for two Years more upon his Land; but at the End of that Time, it will be neceſſary to have Recourſe to the ſame foreign Seed, to keep up the Credit of his Crops: and if he will be at the additional Expence of foreign Seed every Year, he will be repaid with great Intereſt.

CHAP. LVI.

Of the proper Soil for Coleſeed.

WHEN the Farmer has procured a Quantity of good Seed, let him pick out the moſt proper Piece of his Ground for the Crop.

This will depend on the two great Articles, Soil and Situation; as to the firſt, the richer the Land the better; and as to the other, all that is required is, that it lie tolerably dry. There is no Part of ENGLAND where ſo much Coleſeed is raiſed as in the Fens, but the Lands are firſt laid dry that are intended for this Purpoſe: in the ſame Manner they cultivate it in FLANDERS and HOLLAND on Ground originally marſhy; but they are at all the neceſſary Pains and Expence of making them properly dry firſt.

No Lands are more proper for Coleſeed than ſuch as have been ſubject to Overflowings, but they muſt be ſecure from that Accident while the Crop is upon them: and muſt be properly dry, in order to receive it.

Whether this Overflowing have been from Land Floods, great Rivers within Reach of the Sea, or the Sea itſelf, it prepares them equally for the Crop of Coleſeed. Thoſe where Salt Water has come, are properer than any others; but they require ſomewhat more Preparation.

There are Parts of ESSEX where the Huſbandmen might raiſe Coleſeed to a very great Advantage: and in many Places where Grounds have been newly recovered from the Sea by Banking, and the other Methods we have laid down for that Purpoſe, Coleſeed is an excellent Crop.

Every Piece of fat rich Land is proper for it; and the Farmer need not fear to beſtow it upon this Species, for it will yield to his full Content.

If he has a Piece of Ground that is too rank for Wheat, or the other uſual Growths, let him ſow it with Coleſeed: this will yield an extreamly rich Encreaſe, and the Land that would not before have done for Corn, will, by proper Management, be perfectly well prepared for it by this Means.

The right Soil for Coleſeed is mellow Earth. A ſoft deep black Mould, with little other Admixture, feeds it better than any other. The Plants never grow ſo robuſt, nor the Seed is not formed in ſuch Plenty, or ripened in ſuch Perfection on any other. This is the Reaſon that marſhy and fenny Lands, when properly fitted for the Purpoſe, anſwer ſo well with Coleſeed: this black deep mellow Earth is the natural Soil in theſe Places, one ſcarce ſees any other on breaking the Turf in any of them. This is of all others the beſt Soil for Coleſeed, but we have ſhewn it is not limited to this only, any deep Soil that is mellow, and properly ſituated, will do.

CHAP. LVII.

Of preparing the Ground for Coleſeed.

THE Soil we have recommended as moſt proper for Coleſeed, is one of thoſe that does not require any great Labour in Tilling; nor does the Coleſeed demand any particularly to its own Management. The black mellow Earth whereon this Crop ſhould be raiſed, cuts eaſily, and turns freely under the Plow; and when it is in a proper Degree of Dryneſs, breaks freely and finely in the working. All that is particularly neceſſary to fit it for Coleſeed, is to make it very fine; and this, unleſs the Seaſon prove quite unfavourable, or the Huſbandman be very unſkilful, is a Condition whereinto it is brought eaſily.

In MAY the Land intended for Coleſeed is commonly fallowed: in JUNE it is twy-fallowed; and in the latter End of that Month, or the firſt Week in JULY, the Coleſeed is ſown.

After the laſt Plowing, a fine toothed Harrow ſhould be drawn over the Field: after this, if the Weather be dry, let there be a light Roller carried over it: then let it be very gently and tenderly harrowed again. This laſt Harrowing, after the Roller has cruſhed and broke the Lumps, uſually make it as even as the Flower Border in a Garden, and this is the proper Condition wherein it is to receive the Seed.

If the Weather prove too wet, let the Rolling be deferred; and afterwards let it be performed with great Caution: for though the Roller may do great Good in this Caſe, it may alſo do much Harm. In ſome Lands the Soil is naturally ſo looſe, but once harrowing divides it ſufficiently.

CHAP. LVIII.

Of ſowing the Seed.

HERE we enter upon an Article which leads to very different Practices; and it is now the Farmer is to make his Choice which Method he will follow, that of the old, or that of the new Huſbandry. If he chuſe the old and beaten Path, his Neighbours ſoon will ſhew him that it is eaſy for him to reap a large Advantage from this Growth; and it will be the greater to him

him as he the more ſtrictly follows the ſeveral Cautions we have before given him, relating to the Choice of Seed, and other Articles, which few know; and even they too much neglect.

Thus much is in his Power, by following the common Practice, but if he will uſe the Horſehoeing Huſbandry, he will without doubt reap a vaſtly greater Advantage. This Method of Tillage is ſo new, that we have not in all Caſes an Opportunity of recommending it upon Experience; but in many wherein we have not had the Advantage of Trial, we may very ſafely propoſe it from Reaſon, and this is one of thoſe Inſtances.

The great Article in the Value of this Crop, is the Quantity of the Seed produced. This will be the more as the Plants are ſtronger and more flouriſhing; and there can be no doubt but they will be much ſtronger and better when they are raiſed by the Horſehoeing Method; for all Plants are ſo.

There are other Advantages of this Growth beſide the Seed of thoſe we ſhall ſpeak hereafter; but this of the Seed is the principal, and deſerves the firſt and greateſt Notice; the Crop being to be regulated according to that, not any other.

The Huſbandman having his Choice of the Common, or the Horſehoeing Huſbandry, may have either a great many Plants growing irregularly on his Field; or a ſmaller Number diſpoſed regularly and growing longer: it remains to conſider which of theſe will yield him the greateſt Quantity of Seed, and he may be certain this will be from the larger Plants.

In the irregular Manner of growing they ſtarve one another; and the Earth between them cannot be ſtirred and broken to any Depth to give them Nouriſhment: therefore they will be ſmall, and will ſhoot up in Height like Herbs raiſed under Shade; and will have few Branches. In the other Method they will be robuſt, and will ſpread every Way in Branches, and all theſe Branches will be full of Seed Veſſels. The Number will be vaſtly greater, and the Seeds will ripen to a much greater Perfection in them. This will happen becauſe the Plants ſtand at a ſufficient Diſtance; and becauſe the Earth can be turned up and broken by the Horſehoe between them.

In the common Way of ſowing, five Pounds of the Seed is uſually allowed to an Acre. In the Drill Method two Pound and a half will be full enough: and as to the Method of doing it, two Rows may very well be drilled at ten Inches Diſtance, with a five Foot Interval between them.

CHAP. LIX.

Of ſowing Coleſeed in the Drill Way.

IN the common Way of Management, Coleſeed is to be ordered much in the ſame Manner as Turnips. When it is got to ſome ſmall Height, Hoers are to be ſent into the Ground, whoſe Work ſerves very well to cut down the Weeds; and they may alſo thin the Plants where they happen to have riſen too thick, as they will always do in ſome Places from this irregular Manner of ſowing. To thrive well in this Way, they ſhould be ſuffered to ſtand at about ten Inches Diſtance.

In the ſame Manner when the Huſbandman ſhall think proper to raiſe this Crop by the Drill and Horſehoeing Method; they muſt be hoed when they have got a little Strength. In this Reſpect we need not tediouſly repeat the Particulars, the ſame Management ſhould be obſerved as in hoeing of Turnips, raiſed by this Huſbandry, which we have laid down at large in that Place.

The Weeds in the Partitions between the double Rows, are to be cut up with the broad Hand Hoe; and the Plants ſhould be at the ſame Time thinned till they ſtand but one every Foot and half, and theſe not oppoſite in the two Series, but one in each Row oppoſite to the Middle of the Space between two in the other.

When the Plants are thus cleaned out and thinned, let the Horſe Hoe or Hoe Plow be ſent in as ſoon as any Weeds appear in the Intervals. This will thoroughly deſtroy them, and well break the Ground.

This is to be repeated as often as the Weeds riſe, only obſerving this Caution, that at firſt the Plow tears up only the Middle of each Interval; and afterwards that it come nearer the Edges.

The Farmer need not be under any Uneaſineſs at the Diſtance at which his Plants ſtand, or at the Space of Ground that is left vacant between every Pair of Rows. They will yield the more, and he might even have them at greater Diſtances than we have named, without Danger of Loſs. They will grow robuſt in this Way, and as it is their Nature to ſend out on every Side a great many Branches: from theſe there will ſhoot others; and they will all be loaded with Seed Veſſels, ſo that moderately ſpeaking, and judging from what is ſeen in the Courſe of this Method of Huſbandry in other Kinds, one Plant may be expected to produce as much Seed as ſix in the common Way.

CHAP. LX.

Of managing the Crop.

WHEN the Coleſeed is ſown, there are only two Things neceſſary, the ſingling out the Plants to a proper Diſtance, and the keeping them clear of Weeds while young; for afterwards they will need no Care on that Head, the Plants are ſo ſtrong, and draw ſo much Nouriſhment, that nothing can live among them.

Which ever Method of raiſing the Crop be uſed, it is to be thus prepared for a good Growth; and this done, the Owner is to conſider, that it has more Uſes than one. Though the Seed be the principal Conſideration, it is not the only one; and the more Regard is to be

ſhewn to another, becauſe it comes in order of Time before it.

We have obſerved that this Plant is of the eatable Kind. As it does not grow ſo much into Root as the Turnip, its Leaves are more delicate. Sheep are very fond of them, and they afford a rich and wholeſome Nouriſhment. This, properly managed, is a great Article. The Sheep are ſupplied at a Time when they extreamly want Nouriſhment, and the Crop is far from being injured; on the contrary, it is improved by it. This therefore is to be conſidered as a very eſſential Part in the Management of a Coleſeed Crop, and we ſhall give the practical Huſbandman the Method of ordering it to the beſt Advantage.

Coleſeed having been ſown in the Beginning of JULY, ſhoots with ſome Strength; after a few Weeks keeps itſelf up during the Droughts of Autumn, and getting new Strength and Size in the Leaves from the Rains, which introduce the Winter, becomes in a Condition to reſiſt the ſtrongeſt Froſts. It ſtands well, and on every open Day or two, grows during the Depth of Winter; ſo that in JANUARY, FEBRUARY, and MARCH, the Ground is well covered.

The Leaves which now riſe, are of no real Uſe to the Plant in perfecting its Seed, which is to be done the ſucceeding Summer. If they grow very rank they rather are injurious, ſwallowing up too much of the Nouriſhment that ſhould go to the forming of the young Stalk, therefore they may be ſpared without Injury. Here is then a great Supply of Food for Sheep, at a Seaſon when Graſs is low, and it is extreamly wanted; and the Sheep are to be turned in to eat it without any Damage to the ſucceeding Crop of Seed.

There are thoſe who ſow Coleſeed in ſome Parts of NORTHAMPTONSHIRE for this Uſe alone; and it anſwers the Intent very well. They uſe the pooreſt Land for this Purpoſe, and on that, although the Plant would never grow vigorous and ſtrong ſo as to yield any profitable Quantity of Seed, it ſhoots up very well in Leaves.

In the proper Lands for this Growth, the Leaves at this Seaſon are much finer and ſtronger, and they may be eaten without Damage to the Crop.

There are thoſe who prefer the Cole Plant on theſe poor Lands for Food for Sheep, to the young Growth on ſuch as is richer, and they ſay it is more wholeſome; they are not without Reaſon, but their Experience on this Head ſhould not have led them to diſcard the Uſe of Coleſeed for feeding on rich Ground, but to uſe it with Diſcretion.

The Diſadvantage that attends the feeding of Sheep on the rank Growth of Coleſeed in rich Ground is, that it makes them ſwell. This is the ſame Conſequence that is taken Notice of in the feeding them on Clover, but it is eaſily remedied. 'Tis only at firſt that this rich Food takes ſo ill an Effect, and this may be prevented by proper Regulations. When the Sheep are firſt turned in, let it be toward the Middle of the Day; and an Hour before Sun-ſet let them be driven out again into a common Paſture. The next Day let them be turned in earlier, and driven out later; and ſo the third, fourth, and fifth: after this let them be juſt driven out at Night for two or three Days more, and let in again as ſoon as they will in the Morning. This will prevent the Effect of the Coleſeed at firſt, and being now hardened to it by a little Cuſtom, they may be left in the Fields of it altogether, and will thrive upon it excellently, without the leaſt Damage.

Under this Article of the Effect of Coleſeed on Sheep, it is proper to mention, that the firſt Shoots are not all that ſerve this Purpoſe. There is another Growth of them that is leſs rank, and that the Sheep love better; and which not being liable to affect them with any Diſorder, is to be truſted to them at their Diſcretion.

We ſhall in the next Chapter treat of the gathering of Coleſeed, and in an exact Method, we ſhould after that name the Shoots which riſe from the Roots and old Stumps of the Stalks; but theſe being a Food for Sheep, we ſhall treſpaſs upon Regularity, to avoid dividing this Article of their Feeding.

The Shoots of the Coleſeed after gathering the Stalks for Seed, are this mild, ſweet, and wholeſome Food we have been naming. Theſe grow very ſtrong when there has been Rain, but they are never rank or over-rich. Every one knows the Difference there is between the Cabbage and Coleworts; full grown Leaves firſt cut for the Pot, and the Sprouts that grow on the Stumps and Stalks after cutting; the Difference is juſt the ſame between the firſt Growth of large Leaves from the Coleſeed Plant, and the Shoots that riſe after the cutting down the full grown Stalks for Seed.

The Root of the Cole Plant is very ſtrong, it does not decay as many others do when the Seed ripens, but the Crop being cut for that Purpoſe, the Strength below ſoon ſhews itſelf: a great Number of Shoots riſe from the Part of the Stalk where it was cut off, and from the Joints between that and the Root, and ſome from the Top of the Root, ſurrounding the Stalk.

If the Coleſeed Plants have been cut up for Seed in the End of JUNE, theſe Shoots begin to appear about the ſecond Week in JULY.

They make but a ſlow Progreſs while the Weather is dry and ſultry, as it often is for a conſiderable Time at this Seaſon; but when ſome Rains come, they gather Strength and riſe apace.

Theſe all tend to Stalks, and would form ſo many new Plants for Seed, but that would not ripen well, nor would come in any Quantity; therefore it is not the Farmer's Intereſt to encourage it, and happily for him the Beginning of the Shoot is at a Seaſon when the Weather ſeldom favours its riſing to any Heighth.

Before theſe young Shoots get Strength for riſing up to Stalks, the cold Mornings come in, and ſtop them, ſo that they continue ſmall and low; but they grow buſhy from the Nouriſhment they receive from Rains; this is juſt what the Farmer deſires, and they grow more and more fit for the Sheep, and are in excellent

lent Condition for them at the Time when they are moſt wanted.

We ſhall add to this general Account of the Coleſeed Sprout, ſuch particular Obſervations as may be uſeful to the practical Farmer.

In the firſt Place he muſt conſider the Condition of his Stock, and the Value of the Land on which this Crop is to grow: by theſe Articles he will be led to know how far it is proper for him to encourage, or ſuffer the ſtanding of it after the material gathering for Seed: for in ſome Caſes it may be not at all worth while, and in others very profitable.

If from the Circumſtances and Situation of the Ground, and his Stock, he find it adviſeable to continue the Growth, he will vaſtly increaſe it by a proper Management.

If it be ſown at random, according to the common Methods of Huſbandry, it muſt be hand-hoed juſt as the Shoots appear. Nature may be left to herſelf for a little Time, after the Stalks are cut down, and ſhe will give Strength enough to the Roots to make the Shoot; but then if a dry Seaſon follow, as is uſually the Caſe, theſe young Shoots will turn yellow, and threaten Decay.

In this Caſe it will be proper to ſend in the Hoers to clear the Ground between the Stumps, and the deeper they cut the better, for the beſt Work of this Kind is very ſuperficial and ſhallow.

The Weeds are few and ſmall that can ſtand upon a ripe Coleſeed Ground, ſo that the deſtroying theſe is but a ſlight Part of the Deſign in Hoeing: its great Advantage lies in breaking the Ground, and making it better receive and detain the Dews, therefore let it be broke as much as this ſlight Inſtrument will do it.

This Hoeing has alſo another Uſe, which is the cutting aſunder ſome of thoſe fibrous Roots that ſpread from the Bottom of the Stalk, under the Surface. Each broken Root in this Caſe will ſend out many new ones, and theſe will have a freſh broken Earth wherein to ſpread, and to draw that Nouriſhment with which the Dews and Rains enrich it. This we have ſhewn already to be extreamly effectual in the ſupplying all Plants with Nouriſhment, from the deeper and more perfect Method of Hoeing; and we ſee that in this ſlight and imperfect Kind, the Freſhneſs and free Growth of the Shoots immediately after ſhews the Benefit.

From this, which is the Method to be uſed for promoting the free and ſtrong Growth of the Shoots in the common Way of Huſbandry, we ſhall proceed to that more beneficial Way of doing it by the Horſehoeing Method, when the Plants have been ſown by the Drill. Nothing is of ſo great Service to this Crop, and indeed, as we have ſaid already, to any other, as the breaking the Ground while the Plants are growing upon it; but this Advantage is always the greater, as the breaking the Earth has been done the more perfectly.

We have adviſed the Farmer to conſider the particular Situation of his Farm, his Stock, and the Value of his Land, in order to determine whether or not he ſhall continue to raiſe Coleſeed upon the ſame Piece of Ground. If he reſolve to do this, we have ſhewn him how it is to be effected in the common Method, by promoting the Growth of the young Shoots, but this is only for a Time: on the contrary, in the Horſehoeing Method, the ſame Piece of Land, if the Farmer think convenient, may bear Coleſeed for ever, and that in a very beneficial Method, not only for the Crop, but the feeding.

In this Caſe we are to ſuppoſe the Coleſeed raiſed in double Rows, with proper Intervals between Pair and Pair, as we have directed. It is now we will ſay, June, the Plants are vigorous, and they will ſoon be ready for cutting. The Method of doing this we ſhall ſhew in the ſucceeding Chapter.

The Intervals afford an excellent Space for the Management of the Plants when cut, and as ſoon as they are cleared off, and the Seed thraſhed out, they are to be plowed up with the Horſe Hoe or Hoe Plow. This deep plowing furniſhes the Roots of the old Plants with abundant Nouriſhment, ſo that they ſhoot up the Sprouts before-mentioned in vaſt Abundance, and with great Strength; and at the ſame Time double Rows of freſh Seed may be ſown in the Middle of each Interval for a ſucceeding Crop. In this Caſe both will flouriſh greatly. The Leaves from the Roots of the new ſown Plants, and the Sprouts from the Stumps of the old ones; theſe laſt will grow with a particular Freſhneſs and Vigour, becauſe all the working of the intermediate Earth for the ſowing of the new Crop, will be ſo many Additions of Tillage upon Tillage for them; and the Roots of the Seedlings will not ſpread ſo far at firſt as to interfere with them. Thus they will grow and flouriſh together during the Remainder of the Summer, the Autumn and the Winter; and in early Spring, there will be a double Supply of Food for the Sheep.

In the End of March when the Sprouts are well eaten down, for the Sheep having their Choice of both, will be fondeſt of them, they are to be plowed up by the Hoe Plow; and the Places where they ſtood are to be made the Intervals for the new Crop.

This new Succeſſion will by the Time juſt mentioned, have ſpread out their Roots in Abundance toward the Places where the old Crop grew: the plowing up of the Roots of that Crop, will break and cut off thoſe of the young Plants; and this Earth being thoroughly broken by the ſame Operation, will be rendered full of Nouriſhment, and ready to receive thoſe innumerable new ones that will grow from the broken Ends of the old. Thus the Ground will be by the ſame Operation cleared and tilled, and the Crop will grow in a ſurprizing Manner: much better than any other Way. The Plants will be very vigorous, large, and full of Seed; and the Crop will be ripe and ready for cutting, a Fortnight ſooner than that raiſed the common Way.

In this Manner, only repeating the ſame Management on every new Occaſion, the ſame Piece of Land may be made to yield a continual Succeſſion of Coleſeed Crops, without fallowing; and, if it be tolerably good Earth, without Manure.

One thing there is, concerning which we muſt caution the Farmer who ſhall have the Senſe and Spirit to raiſe Coleſeed this Way, which is, the guarding againſt the too great Luxuriancy of the Crop of Sprouts. We have ſaid they advance ſlowly during the Summer, in the common Way, and that it is to his Advantage, for otherwiſe they would run up to Stalk, which is not his Intereſt, as not the Seed but the Leaf is to be uſeful to him the enſuing Spring.

If Rains happen ſoon after the cutting the old Plants, this Accident of the new Shoots running to Stalk is apt to happen in the common Way of Huſbandry, becauſe more Nouriſhment is ſupplied by the Moiſture than is wanted in the Leaves; and the ſame Thing happens much more certainly from the deep plowing the Intervals, when the Coleſeed is raiſed by the Drill and Horſehoeing Method: therefore if Rain falls ſoon after, or if the Shoots are over rank without that Aſſiſtance, as will often be the Caſe when the Ground is tolerably good, let him go round the Field himſelf up and down every Interval, or employ ſome truſty Perſon to do it, and with his Thumb and Finger knip off the Top of every Shoot that is running up to Stalk. By this the Advance upwards, which is of no Uſe, will be ſtopped, and the ſame abundant Nouriſhment which was ſupplying the Growth that Way, will furniſh new Shoots upon the Sides of the firſt. So that in a Field of this Plant, tolerably good as to Soil, and managed in this Manner, there ſhall ſtand, as it were, a Foreſt of green low Buſhes without one Stalk, riſing toward flowering: for when ſuch as were moſt forward are nipped this Way, the cold Weather coming on checks them, and all the Nouriſhment they draw from that abundant Reſource of Pillage, will go to enlarge the firſt Leaves and form others. A little Obſervation of what paſſes in the common Courſe of Nature on other Occaſions, will ſhew the Farmer how eſſential and material a Point it is to nip theſe riſing Stalks. They will be of no Uſe as to Seed, that we have ſhewn him already.

It is not a Crop of Seed he now wants, that he has had before, what he in this Caſe deſires to have is a Supply of Leaves, for the Food of his Cattle; and the Merit of this Crop is, that theſe Leaves be numerous and freſh, and full of Juice. Let him obſerve what happens to the Leaves of other Plants: when they have all the Nouriſhment to themſelves, they are numerous, freſh, and full of Juice; but as ſoon as the Stalk has got to any Height, and the Rudiments of Flowers and Seeds appear, this being the great Intent of Nature in the Oeconomy of all Plants, the Nouriſhment taken in by the Root all goes there. The Leaves that were freſh, juicy, and green, become withered, dry, and yellow, the older ones fall off; no new ones grow in the Place, and in fine all decay, and the Stalk alone remains riſing naked from the Root.

The Uſe of the Leaves which riſe firſt from the Root, is of the ſame Kind with that of the gaudy and beautiful Parts of the Flower. We have obſerved before, that although theſe ſeem the Perfection, and greateſt Beauty and Excellence of the Plant, they are intended only to ſhield and defend the little obſcure Rudiment of the Fruit, or Seed Veſſel, that ſtands in their Centre; and in the ſame Manner that fine ſpreading Shew of Leaves, which firſt riſe from the Root of a Plant, are in Reality of no other Uſe than to ſecure and preſerve the little Rudiment of the Stalk, which is hid in their Centre.

We ſee that as ſoon as the Duſt from the little Buttons in the Flower has impregnated the Rudiment of the Fruit, the gaudy Leaves decay and fall off, the Nouriſhment being all conveyed to the uſeful Part, the Fruit or Seed Veſſel; and in the ſame Manner, as ſoon as theſe Leaves have defended throughout the Winter the young Bud of a Stalk, and that by the Heat of the Spring Sun begins to riſe in Height, and ſhew its Buds for flowering, all the Nouriſhment is conveyed to it. The lower Leaves have done their Buſineſs, and they fade and periſh.

The Caſe is juſt the ſame in the Shoots from the old Stumps of Coleſeed, as in the Leaves from the Root at the firſt ſowing. The Leaves that riſe from the Top, and from every Joint of the old Stump, have the Rudiment of a Stalk within them. This is the Purpoſe of Nature, but it is the Farmer's Buſineſs in the preſent Inſtance, to check it. When it riſes the Leaves will fade, but ſo long as it is kept down, whether that be done by Art or Accident, all the Nouriſhment intended for it by Nature, will be given to the Leaves. This is the Reaſoning upon which the Practice of nipping off the Buds of the Coleſeed Sprouts is founded. We would have the Farmer underſtand all he is adviſed to practiſe.

CHAP. LXI.

Of the gathering of Coleſeed.

TOward the End of JUNE the Coleſeed Plant, in whatever Way it have been raiſed, will be fit to cut. The Huſbandman muſt therefore keep his Eye upon his Field very carefully toward that Period; for it is of the utmoſt Importance to him to ſeize it when it comes. No Day of the Month, or other preciſe Time, can be named for the gathering this Crop, becauſe the Differences of Soils and Seaſons promote and retard its ripening; and even the Variety of Management, or the Age of the Plant, may make ten Days or a Fortnight Difference in the ripening in two Fields of the ſame Soil in the ſame Year. We have told the Huſbandman about what Time he is to expect it; and ſhall add the Signs by which he ſhall know that it is fit for Harveſt. One Caution we muſt give him withal, that as the Soil and Method of Culture may make a very great Alteration in the Time of ripening, he muſt be upon the Watch accordingly, expecting it earlier by a Fortnight in rich Soils and the moſt careful Conduct, than he need in poor Land in the common Way. It will be in vain that we lay down the Signs of its ripening, if he ſlips the Time.

We have obſerved that the Coleſeed Plant has ſmall Flowers on the Tops of the Stalks and Branches, which when the Leaves fall off are ſuc-

ſucceeded by Pods. As the Flowers that opened firſt are thus followed by the Seed Veſſels, other Flowers open upon the Tops, which ſhoot up continually higher and higher. Thus, when the Plant begins to flower, nothing is ſeen but a little Button or Tuft of Buds at the Top of the Stalk, and of every Branch, with one or two Flowers opened or opening upon it; but when it has been ſome time flowering the Aſpect differs, for then the Branches having lengthened, from the Time of their beginning to flower, all that Part of them which was the Top, and where ſucceſſively the former Flowers appeared, is covered with Seed Veſſels; thus each Branch terminates in a Spike or Seed Veſſels a Foot or more in Length, with a few Flowers at its Top.

The Quantity of Seed is the Riches of the Crop, therefore it would appear at firſt Sight, that the longer the Plant ſtood, ſo long as it continued flowering, the more advantageous would be the Growth, but there are Limits to this Encreaſe, beyond which all is Waſte.

The Courſe of Nature is to ripen theſe Seeds, and then ſhed them upon the Ground for producing the Plant again: therefore when ripe the Pods open of themſelves, and the Seeds are loſt. This no Art can prevent; and for that Reaſon the Time is to be watched when any of them begin to open, and that is the exact Period for gathering.

When a new Flower is formed, the Rudiment of the Pod from which the laſt fell, is but ſmall; it continues to encreaſe in Size before it begins to harden, or properly ſpeaking to ripen, ſo that ſeveral ſucceſſive young ones are left by the Flowers before any one is ripe. This is the Occaſion of the Length of the Spike of Pods, while all are yet entire; but when they begin to open let the Huſbandman be ſpeedy in gathering, for he will deceive himſelf very much if he imagine it as well to let it alone awhile, ſuppoſing the new formed Pods at the Top of the Stalk will make Amends for the old ones that are loſt at the Bottom: the loweſt Pods are the faireſt always, and three of the young ones will not ſupply the Place of one of the lower.

The Farmer now underſtands the Period whereat his Crop is to be gathered; and it will be eaſy for him to judge at Sight when it is about to arrive at that Condition.

The Length of the Spikes of Pods is one obvious and familiar Token, while they are ſhort the Crop cannot be fit to gather, becauſe, while they are in that Condition there are but few of them, and none of theſe are ripe.

When theſe Spikes have got a conſiderable Length, their Colour is to be regarded. The Pods while young are always green, as they grow toward Ripeneſs they loſe that Colour; at firſt they become pale, then yellowiſh, and laſtly browniſh. The whole Spike, while very young, is green.

When ſome of the Pods approach toward Ripeneſs they change Colour, and the Greenneſs is only ſeen at Top; when, upon a curſory View, there are ſome found to grow browniſh at the Bottom, and thoſe in the Middle are yellowiſh or pale, thoſe at the Top only being green, then the Time of gathering is at Hand. It is the Intereſt of the Owner to let them ſtand ſo long as all are ſafe, but no longer. He is therefore now to look into the Field once or twice every Day, in a more ſtrict Manner. He muſt examine the bottom Pods of the ripeſt Spikes; ſo long as theſe are cloſe all is ſafe; but as ſoon as ſome of them begin to open the Time of gathering the Crop is come, for after this every Hour's ſtanding will be attended with Loſs.

The beſt Method of cutting Coleſeed is with a ſtrong Sickle, in the ſame Manner as Wheat is reaped: but this muſt be done carefully. There is no Part of the Farmer's Occupation that requires more expert and honeſt Labourers than this. The Stalks are pretty thick, and by that Time the Seed is ripened thus far, they have loſt their juicy Condition, and are grown hard and ſticky. They are not eaſy to be cut, and yet that muſt be done evenly, and with little ſhaking. A great deal of Care is to be taken, that the Sickle goes eaſily through them, and when ſeparated from the Root they muſt be laid gently down in Handfuls, that they may dry.

About one third Part of the Seed is ripe at the Time when the loweſt Pods are ready to open: in the lying expoſed to the Heat of the Sun at this Seaſon, more than another third hardens, and becomes good; ſo that above two thirds of the whole Quantity of Pods yield good Seed, and this is all that can be expected; for if the Farmer were to ſtay for the ripening of the other third, while growing, he would loſe the Seed from the lower Pods, which is much more valuable; and the Seed is of a ſufficient Growth to ripen or harden in the Sun after the Plant is cut down.

In the common Way of ſowing Coleſeed, 'tis difficult to lay the Handfuls well to dry from the reaping, and a great deal of the beſt Seed is loſt for want of this Advantage; but in the Way by drilling all will be eaſy, and there will be no Danger of Loſs, for the Intervals will ſerve excellently for ſpreading the Plants.

When the Crop has been once laid on the Ground it is not to be ſtirred till dry, for the Seeds in the lower Pods are ſo looſe, that they will ſhake out with the leaſt Motion, and be loſt. What is required from this Expoſure is, to dry and harden them, and they will get this ſufficiently by lying tolerably thin, without being moved. If the Weather be very hot the Buſineſs is done the ſooner, if otherwiſe ſomewhat more Time is required, generally from ten Days to a Fortnight proves ſufficient. The Proof that they are dried enough is, when the Pods toward the upper Part of the Spikes open eaſily, and the Seeds in them are hard.

CHAP. LXII.

Of thraſhing the Plants, and the Uſes of the Seed.

WHEN the whole is in this Condition, nothing is required but to get it to the Barn, and thraſh it. In Lincolnshire they ſave themſelves a Part of this Trouble, by thraſhing

ing it in the Field, they ſpread a large Sheet upon a level Part of the Ground, and lay a Quantity of the Herb on it: a little thraſhing does to diſlodge the Seeds, which are already looſe and moſt of them in Danger of falling out of their own Accord. I have ſeen this practiſed without much Loſs, but it is an irregular and awkward Method; it leaves the Farmer's Produce, after all his Toil, very much at the Mercy of the Winds, and cannot be performed ſo well as in Doors.

The Method I would therefore recommend to the Huſbandman, if the Ground be any thing near Home, is this, let a Parcel of large Sheets be ſpread in the Field, and the dried Stalks carefully taken up in their Bundles, and laid on them. Each Sheet will hold a great deal this Way; for though the Parcels muſt be very gently moved to the Sheet, they may be preſſed hard, and handled roughly there; for what Seeds fall out will be ſaved.

When the Sheets have as much in them as they will hold, the Edges and Corners are to be gathered in and faſtened, and the ſeveral Parcels are to be carried to the Barn: there they are to be thraſhed with a careful but light Hand, that all the Seed may be got out, and as little of it as poſſible bruiſed, for it is tender and eaſily hurt, eſpecially when freſh.

After it is ſeparated from the Refuſe that was mixed among it in the thraſhing, it muſt be ſpread on a Floor pretty thin, and turned often till it is thoroughly dry and hardened; for otherwiſe, when put up, it will quickly grow damp and mouldy.

The Seed thus prepared for keeping is alſo in a better Condition for immediate Uſe, than when too green: the Farmer may ſell it, or ſend it to the Mill on his own Account to be ground and preſſed for Rape Oil, the Sale of which is certain, and the Price, conſidering the Charge, tolerably high. If the Seed be ſold as ſoon as thraſhed and dry, it brings from eighteen to two and twenty Shillings a Quarter, and the Produce at an Average in the common Way of Management, and upon middling Ground, may be reckoned at five Quarters to an Acre: much more Advantage may be made of it, if the Farmer will have the Oil drawn himſelf; and in the Method we have propoſed by the Drill and Horſe-hoeing Huſbandry, it will be eaſy for him at any Time to double his Profits: in many Caſes, taking all the neceſſary Care, and making the moſt of his Produce, he may make it treble.

We have obſerved that in the new Method of Huſbandry, the ſame Piece of Land may be made to bear Coleſeed ever ſo many Years in Succeſſion. According to the vulgar Practice the ſeveral Kinds of Corn may be ſown after it. In NORTHAMPTONSHIRE, where the Land is rich, they find Coleſeed a very good Preparer of it for Barley or Wheat; in LINCOLNSHIRE, where it is not ſo good, they ſow Oats after it very profitably.

The Uſe of the Coleſeed is not over when the Oil has been preſſed from it. The Cakes that remain are a large Quantity, and as the freſh Leaves feed Sheep, theſe in a proper Method of giving them, turn to a very good Account for feeding of Cows. In Winter this is an excellent Food for them, for keeping them in Heart and Strength, at a Time when other good Food is ſcarce.

Calves are alſo to be fed with Coleſeed Cakes very profitably, but that in a particular Manner. After the Oil is preſſed out as clean as the common Practice can obtain it, there ſtill remains ſo much of it in the Cakes, that when they are beat to Powder, and mixed with hot Water, they make it white and milky, in the ſame Manner as ſweet Almonds beat up with Water make an Emulſion. This is the Way of giving it to Calves, and it proves a very rich, wholeſome, and ſtrengthening Food. Calves may be fed with this from three Days old, till they are fit to eat Graſs or Hay.

In FLANDERS and HOLLAND, where Coleſeed is raiſed, and its Oil preſſed in great Quantity, and to great Advantage, they conſtantly make both theſe Uſes of the Oil Cakes: it is ſurprizing that in many, nay in moſt Parts of ENGLAND, where they raiſe this Crop, they know no other Uſe of the Cakes than as firing. In LINCOLNSHIRE they heat Ovens with them, while they want Winter Proviſion for their Cows. In ſome few Places, and but few, they have got into the Method of giving the Cakes in Water to their Calves.

There are many Reaſons to wiſh this Species were more cultivated than it is in ENGLAND, but there is but poor Hope of that being brought about, when thoſe who do raiſe it know but a ſmall Part of its Management, or its Advantages.

CHAP. LXIII.

Of Liquorice.

HItherto we have treated of Articles known to be raiſed by Huſbandmen, in different Parts of the Kingdom, and familiar by Name among Country People; ſo that the Farmer who never had before thought of raiſing them himſelf, yet knew others did ſo: here we mention one which, being leſs common in the Profeſſion, may make ſome of the common Practiſers of Huſbandry wonder at its being added to the Liſt of Things recommended to them for Culture. They know Liquorice by Name, and they are ſenſible that it brings a large Price at the Druggiſts: much of it is imported from GERMANY, and other Parts of EUROPE, but we can acquaint thoſe Farmers who have not been in the Way of knowing it, that very conſiderable Quantities of this valuable Root are raiſed in Fields, in ſome Parts of ENGLAND, and may be in many others. We have all along obſerved, that great Gains are to be made in Huſbandry by going out of the common Road, and this is one of the Inſtances.

We would not adviſe the Farmer to let alone his common Occupation, or to neglect the uſual Articles of his Profeſſion; on the contrary, we have made it an eſſential Part of our Work to inform him of every Method of managing them to the beſt Advantage; but with the Cultivation

tion of these we would have him keep his Eyes open to that of other Things: particular Soils and Situations suit particular Growths, and we would have him a Master of the several Articles in his Business, uncommon as well as common; that when he has an Opportunity of gaining considerably, by adding some new Species, he may not over-look the Advantage. It is in this Light we propose Liquorice to his Consideration; and having thus far explained the Intent of naming it in this Place, shall proceed to acquaint him with the Nature of the Plant, its proper Soil, its Culture and Advantages.

The Root of the Liquorice Plant is a Yard long, and as thick as a Man's Thumb. It is soft but very tough, brown on the Outside, and yellowish within: it is full of Juice, and though not easily broken, may be beat out into a Kind of thready Substance: its Taste is very sweet and pleasant, it spreads and encreases naturally in the Ground, and is less in Danger of Accidents than most other Roots.

From this Root rise the Stalks, which are tall, firm, and tough, they are a Yard or more in Height, they have but few Branches, they are of a brown Colour, and covered with a Kind of clammy Moisture, so that they stick to the Fingers when touched.

The Leaves are somewhat like those of the Tare, each being composed of a great many smaller ones, placed on the two Sides of a Stalk, or middle Rib.

The Flowers are also of the Form of those of the Vetch or Tare, but small and inconsiderable; and they are succeeded by Pods, which are short, flatted, and upright.

The Flower of the Liquorice stands in a small green Cup, which remains after it is fallen, and encompasses the Bottom of the Pod. This Cup is composed of a single Leaf, which is hollow at the Bottom, and toward the upper Part is divided into two Lips: the upper Lip is again divided into three Parts, two narrow and pointed at the Sides, and the middle one broader and nicked in the Middle: the under Lip is undivided, and is narrow and pointed. This is the Cup which receives and sustains the Flower. The Flower itself is composed of four Leaves, in the Manner of all the Pea and Tare Kind. In the Body of the Flower there are ten Filaments, one stands alone, and the other nine in a Cluster; at the Tops of all these there are round Buttons, and in the Centre of these rises a small Lump, which is the Rudiment of the Fruit or Pod; this is buried in the Cup, and sends out a long Filament pierced at the Top, to receive the Dust from these Buttons for impregnating the Seeds.

When the Flower has fallen off, this Rudiment by Degrees enlarges into a short, flat, and sharp Pod, in which are a few Kidney-shaped Seeds. There are two Kinds of Liquorice beside the common, distinguished the one by having hairy, and the other prickly Pods, but these are not worth the Farmer's Notice; the Smoothness of the Pod distinguishes the right genuine Liquorice used by the Apothecaries, as does also the Bigness, Juicyness, and fine Taste of the Root; the others have sweet Roots, but they are harder and less pleasant.

The common Liquorice is a Native of Germany, France, Spain, and Italy; we have it not wild in England, but being natural to Climates so much resembling our own, it grows with us in Perfection.

It was very well known to the Antients, who called it Adipsos, because it conquers both Hunger and Thirst. Theophrastus mentions it under the Name of the Scythian Root, Scythia being the first Country where it was known to be cultivated. It served these People by Way of Nourishment, they would live a long Time upon this Root and Mares Milk Cheese, without seeking after any other Food. It is raised in some Parts of Yorkshire, Nottinghamshire, and Surry with us; and may be introduced in many other Places, to the great Benefit of the industrious Planter.

CHAP. LXIV.

Of the proper Soil for Liquorice.

ALMOST all Plants thrive best in a rich Soil, but Liquorice will not grow in any other. One Requisite more there must be in the Land for this Purpose, that is, the Soil must run deep. The thriving of Liquorice depends altogether upon the free Depth of the Mould, and its Length of Root, which is the great Advantage cannot be expected in any other.

We expect to see the Root a Yard or more in Length, and it must have free Passage, otherwise it will not grow strait; this Regularity of Shape is not only a great Beauty, but a real Advantage, for the crooked Roots are never so tender and juicy as the others, nor do they so soon arrive at their due Growth.

The proper Ground for Liquorice is that which has a deep Coat of mellow Earth, a black Mould that begins directly under the Turf, and runs three Spit deep, without any great Mixture of other Matter in the Way. This is the best natural Soil for this valuable Plant, but there are others which will do by Nature, and others yet that may be so prepared by Art, as very well to answer the Purpose.

After this fine black Mould the next Soil in Nature is a deep rich Loam, that has not much of the Clay in its Composition, and has a good deal of fine Garden Mould among it.

The third natural Soil that we shall name as fit for this Plant, is the deep, warm, sandy Kind, which is not barren, but with its Lightness and Warmth has some Richness.

In all these Soils the Depth ought to be at least a Yard, before there is any hard Bottom, and that must be examined; for if it prove a Clay the Liquorice will never thrive, because of the Coldness and Dampness that naturally attends such an under Stratum, the wet lodging upon it and starving the whole Soil.

What the Liquorice requires for perfect thriving, consists in four Articles, Depth to penetrate, Lightness in the Soil that it may make its Way easily, Warmth to promote its Growth, and Richness to supply it Nourishment. These Advantages it enjoys in various Degrees,

in the ſeveral natural Soils we have named, for no one of them has them all in Perfection; and therefore it may be poſſible by Art to provide a Soil for the Growth of Liquorice, which ſhall be better than any of theſe.

To explain this by Particulars. In the mellow Earth or black Mould, there is often Depth and Lightneſs enough, and there is always Richneſs to ſupply it Nouriſhment; but then this Soil is apt to be cold: there wants therefore the fourth Article Warmth, to promote its ſpeedy Encreaſe in Bigneſs. In the ſame Manner in ſome of the loamy Soils there is Lightneſs, Depth, and Warmth, but there wants Richneſs; and finally, in the ſandy there is Depth, Lightneſs, and Warmth in the greateſt Degree, but there wants Richneſs and Nouriſhment. The Effect of theſe ſeveral Advantages and Diſadvantages in the Soil, for the Growth of Liquorice, I have regarded in the Obſervations I have made on the Places where I have ſeen it grow.

Thus in YORKSHIRE, where the Soil is a mellow rich Earth, as about POMFRET, the Liquorice is very large and juicy, but it grows ſlowly; in NOTTINGHAMSHIRE the Soil is loamy, and the Liquorice grows moderately, but is inferior to the POMFRET Kind; and in SURRY, where the Soil is ſandy, the Root grows quick, but it is meagre, dry, and poor, it never has the fine juicy Texture, or rich Taſte of the YORKSHIRE Kind.

From theſe Advantages and Defects in the Plantations of others, the judicious Farmer will find the Way to make the beſt Profit of his own, by adding what is wanting in each, and avoiding what is amiſs. It is to be obſerved, that in the preceding Obſervations we ſpeak of theſe ſeveral Soils left to Nature, for when they are manured they are changed; and it is impoſſible to deſcribe the Soil of any Place, as altered by the various Means of Culture.

To theſe ſeveral Grounds for the Service of this Article, we are to add the made Soils about LONDON, where there is a great deal of Liquorice raiſed in the Grounds of Planters to a conſiderable Profit. This is large and juicy, but it is not ſo good as the YORKSHIRE Root, it is leſs tough, and is more ſubject to Accidents, nor has it the fine yellow Colour, or true rich Taſte of the beſt Northern Liquorice. It will grow mouldy if laid up in damp Sand, whereas the YORKSHIRE Kind will be perfectly well in that Manner for a long Time; and when beaten out for Uſe the Threads are more wet, and as it were rotten; they have not the ſtringy Toughneſs of right Liquorice: the Plant is the ſame in all theſe Conditions, 'tis the Soil only that makes the Difference. The Liquorice of SURRY is ſtarved, that of NOTTINGHAMSHIRE is but half nouriſhed, and that raiſed in Gardens about LONDON is over-ſupplied with Nouriſhment, and that is of too rank and moiſt a Kind: the ſame is the Caſe with many other of the Products of theſe common Gardens, though leſs regarded.

We ſee by the ſeveral natural Soils, and their Effect, and by that of the made Ground about LONDON, that each of the others may be improved; conſequently that a made Soil may be better for Liquorice than any of them, but we ſee at the ſame Time, that the Garden Ground about LONDON is not the right Kind; what the careful Huſbandman is to learn therefore from theſe ſeveral Obſervations is, that there is an eaſy Way of mending any natural Soil, for the Production of Liquorice; and that whatever his Ground naturally be, he may convert it into a proper Sort by additional Mixtures.

The ſeveral Defects and Faults of thoſe Soils, on which Liquorice is propagated in different Counties of ENGLAND, are ſo oppoſite to one another, that whoever has conſidered the Principles laid down in the Beginning of this Work, will find it is very poſſible, and very eaſy to improve any one of them, by a Mixture of the other; and conſequently, that if he have a Soil of the Nature of any one of theſe, he may improve it and encreaſe his annual Produce greatly, by mixing with it ſome other Soil of the Nature of one of the others.

Thus if he have a mellow Earth, or deep black Mould, of the Nature of the POMFRET Kind, he will know that Liquorice will grow fine, but ſlowly with him; therefore let him, when he digs up his Ground of this Kind, mix with it a good Quantity of Sand, ſuch as compoſes the principal Part of the Soil in SURRY; and this will make it grow quicker, while there is yet enough of the natural Richneſs of the Earth to feed it very well. In the ſame Manner, if his Soil be loamy, as that of NOTTINGHAMSHIRE, or ſandy, as that of SURRY, let him add mellow Earth to it, and he will make his Liquorice rich, while the natural Condition of the Ground continues to haſten its Growth.

He ſees in the ſame Manner the Effect of Manure about LONDON, where it is uſed in great Plenty; and he finds it has Advantages and Faults. The Advantages it poſſeſſes are owing to the Dung that is uſed, and the Faults are owing to the Rankneſs of that Dung, which is too much for a Root of this Kind.

Having laid thus before him the Reaſons of every thing he is to do, I ſhall add by Way of Example, what I have myſelf practiſed with great Succeſs, for the raiſing this Species, and lay down what I am convinced is the very beſt Method of improving and preparing a Soil for it. I ſhall limit it to the ſingle Inſtance of my own Experience, but the Effect being ſeen the Steps may be varied according to Occaſion.

I had a Field of an Acre, or ſomewhat leſs, the Soil was a good light Loam, but not very rich, and it ran near three Foot deep, with a firm light Gravel at the Bottom. It came into my Mind to try this for Liquorice, and I prepared it in this Manner; I threw on thirty Load of very old and well rotted Dung; and forty Load of Mud, from the Bottom of a River that ran near it. All this I plowed deep in, and repeated this Operation till it was thoroughly mixed with the natural Soil. This had before been of a yelloviſh or Orange Hue, and ſandy, but when this Addition was well wrought in it looked black, and broke mellow, in the Way of Garden Mould. This Field bore the fineſt Liquorice I ever ſaw any where, and I have examined moſt that is raiſed in ENGLAND. As to the Manner of planting it, that will be delivered in the following Chapter.

CHAP. LXV.

Of planting Liquorice.

LIQUORICE, though raiſed in Fields, requires a Sort of Garden Culture. The Spade is a much more proper Inſtrument for preparing the Land for its Reception, than the Plow; for it requires to be broke and rendered fine, to a Depth that the Field Inſtruments can never reach.

There is this Comfort however to the Huſbandman in Reſpect of it, that if the Land require a very expenſive Tillage, the leſs of it ſerves; a few Acres will yield a vaſt Produce in this Root, and the Price is ſo much greater than that of moſt other Things he can raiſe, that there is no Reaſon to grudge the Charges.

To make the Ground ready for receiving of Liquorice. It is firſt to be dug up carefully, but even this is not to be done in made or improved Soils, till the Additions have been thoroughly blended and rotted in the Ground.

Thus ſuppoſing an Earth improved as in the laſt Chapter, by the Addition of rotten Dung and Mud, theſe are to be plowed in toward Autumn, and the whole is to be broke again once or twice during the open Weather in the ſucceeding Winter, and ſo left to mellow; for the Dung will not otherwiſe thoroughly break and mix with the Soil. If it remain in Strings or Cakes, it will not be eaſily broke by the Spade; and if it remain whole, will break in upon that perfect Lightneſs of the Earth, which is ſo eſſential to the Growth of Liquorice. For if there be the leaſt Thing to obſtruct the Paſſage of the Roots, they loſe their Straitneſs, and after that they never thrive.

When the Ground has lain thus the Remainder of the Winter, let it be dug in the following Spring with particular Care, and in peculiar Manner. Let the Labourers be ſent in about the Middle of February, and let the Maſter's own Eye be over them, or that of ſome truſty Perſon in his Stead. They muſt dig every Part of the Earth thoroughly, no leſs than three Spits deep; and as they lay it, muſt carefully break every Lump, though but ſmall, that the Ground may be ſmooth and level at the Surface, and be in a Manner as fine as Sand all the Way down. This will never be honeſtly done without great looking after, and it is very eſſential that it be ſo done; the Expence is conſiderable, but the Profit anſwers; and of this the Huſbandman may be perfectly aſſured, that by every Shilling he would ſave in this Work, he will loſe ten in the Crop.

When the whole Piece of Ground is thus prepared, the Liquorice is to be planted; and in this the ſame Care and Caution are neceſſary as in the reſt, for the leaſt Omiſſion, or the leaſt Careleſsneſs, will be attended with Loſs. The firſt Care in this Reſpect is, the Choice of proper Sets or Plants; and the ſecond is, the placing them properly in the Ground.

For the Choice all depends upon their being in good Condition, and having a good Bud, or as the Planters call it, an Eye. They are to be got from the Seeds, or the Heads of the old Roots; and their beſt Length is a Foot, or thereabouts.

The good Condition of theſe will be ſeen by their Soundneſs, Freſhneſs, and clean Surface; and the Strength of the Bud or Eye, is an Article in which none can be deceived.

'Twill be toward the Beginning of March, by that Time the Ground is thus perfectly prepared, and the Sets are choſen, then they are to be planted in the following Manner.

Let there be got ready a Gardiner's Line, of ſuch Length as to reach croſs the Ground if ſmall; if larger, it may be removed from Diſtance to Diſtance, a Couple of Sticks ſharpened at one End, and a Ball of thick Cord is all that is needful for this Purpoſe. Beſide the Line, there is to be a ſetting Stick, which may be of any convenient Length at Pleaſure; but it is beſt to have it of a certain Dimenſion in this Reſpect, that it may ſerve as a Meaſure; and for this Reaſon I adviſe it to be juſt a Foot and half long, with a Handle like that of a Spade, and a point Head, with a ſquare Piece of Iron in the Manner of a very large Spike, hollow'd at the large End to receive the Point of the Wood.

Theſe Things being ready, let the Stake to which one End of the Line is faſtened, be ſtuck into the Ground a Foot from the Edge of the dug Part, and the Line let looſe, that the other Stake may be carried to the other End of the Ground, or as far as the Line will by its Length permit; and then it muſt be ſtuck into the Ground, drawing the Line tight, at the ſame Diſtance from the Edge of the prepared or wrought Part. Thus there will be a ſtrait Line drawn along the Skirt of the Ground, within a Foot of the raw Earth.

Let the Planter now taking his Sets in his Apron, and the ſetting Stick in his Hand, begin to plant, placing the firſt Set at half the Sticks Length from the Edge of the Ground. When he has ſet this, let him meaſure from it along the Line, the Length of the ſetting Stick, and then plant another, and ſo on to the End. This is very familiarly and eaſily done, and the Manner is this.

Let the End of the ſetting Stick, which is pointed with Iron, be thruſt into the Ground, and preſſed till near the whole be in; let it not be ſtirred about, but juſt enough to make an Edge, that the Earth may not fall together. The ſetting Stick being gently drawn out, there will remain an open Hole of about ſixteen Inches deep. Into this a Set of the Liquorice is to be put, thruſting it carefully and evenly in, till the Head of it where the Eye or Bud is, be one Inch beneath the Surface: then the bottom End will be about the Bottom of the Hole, and a little Mould being drawn over the Top, the Set is compleatly well planted.

One being ſet in the reſt is very eaſy. The ſetting Stick is to be laid along the Line, its Point juſt at the Head of the Set, and its other End marks the Place where the next is to be planted: the Length of the ſetting Stick being a Foot and half, and that being the moſt

advantageous Diſtance at which Liquorice can be placed in the Row.

This ſecond Set is to be planted exactly in the ſame Manner as the firſt, and ſo on till there be a Row planted all along the Line.

When one Row is thus planted, the next is to be ſet into the Ground. As the beſt Diſtance for Liquorice is to plant it in Rows at a Foot and half: ſo the beſt Diſtance of the ſeveral Rows one from another, is two Foot and a half; and in theſe they are beſt ſet not directly oppoſite one to another, but in the Chequer or Quincunx Order.

To execute this, the firſt Row being planted, one of the Sticks is to be removed two Foot and a half by Meaſure into the Ground, and then the other, tightening the Line. Thus there is a Row marked out of the exact Diſtance of two Foot and a half from the firſt. This done, let the Planter take a freſh Parcel of the Sets into his Apron, and taking the ſetting Stick in his Hand, let him make his firſt Hole directly oppoſite the middle Space between the firſt and ſecond Set of the former Row.

When the firſt Set is planted there, according to the Directions juſt given, let him lay down his Stick from the Top of that Set, and meaſuring thus the due Diſtance of a Foot and a half there plant another.

This he is to continue the whole Length of the Line; and there will then be a ſecond Row at two Foot and a half Diſtance from the firſt, and each Plant in it will ſtand oppoſite to the middle vacant Space between every two of the others.

When this ſecond Row is planted, the Line is again to be removed two Foot and a half farther into the Field, and a third Row is to be planted. The ſeveral Sets in this third Row are to be placed directly oppoſite to thoſe in the firſt Row; and when this is done, every four Plants of the firſt and third Row, will have one Plant of the ſecond Row in their Centre.

This Method is to be continued interchangeably through the whole Field, and this is what is called the Quincunx Manner of planting; the Effect of which is, that every Way wherein one looks at the Plantation, when the Stalks are riſen, there appear regular Rows of them the whole Extent of the Field, with regular Alleys between them.

If the Farmer aſk, Whether this we have here delivered be the exact Manner in which Liquorice is planted in thoſe ſeveral Places we have named, we ſhall anſwer him, that it is not. They no where allow ſo great a Diſtance to the Plants; but this is an Error that has prevailed in every Article of Huſbandry, and which we hope to ſee ſet aſide one after another in them all.

Having given him in this Detail of Particulars, the Method which Experience ſhews to be beſt of all others for planting of Liquorice, we ſhall inform him what is the common Method, if he chuſe to follow it; and ſhall lay before him the Reaſons of our particular Rules on each Head.

In this let us not appear to any as being too minute and circumſtantial. The Gardiner may ſay we need not direct him how to draw his Line; but we ſhall anſwer, That it is not to him we are writing, it is the Farmer we are informing in the ſeveral Articles of his Profeſſion; and ſo much of the Gardiners Buſineſs as is needful to him, we ſhall convey in few Words, in the which he will not think us too particular.

The common Way of planting Liquorice is with leſs Regularity, and at ſmaller Diſtances. In Yorkshire they allow nine Inches Diſtance in the Rows, and a Foot and a half between Row and Row; and in ſome other Places, they plant the Sets at about a Foot Diſtance every Way, but without any Regard to Lines or Rows.

There may be leſs Trouble in this random Method of Planting, but there is leſs Advantage. We have ſhewn the Farmer, that whatever Price he pays for Labour, is well returned in the Encreaſe, and it is in no Inſtance more true than here.

In the random Way of planting Liquorice, all that can be done afterwards to promote its Growth, is to hoe the Ground between; but in the Method of planting in Rows, the Earth may be dug at Times between them, which is of the greateſt Advantage to the Growth; and thoſe who have a mind, may plant or ſow any ſlight rooted Crop between them. Of this we ſhall ſpeak more at large hereafter, here we are only treating of the planting the Sets.

We have ordered a large Space, but the Growth will be large accordingly; any one who can count, will be able to ſay how vaſtly greater a Number of Liquorice Roots there will be in a Field planted at nine Inches, or a Foot Diſtance; but Liquorice is not ſold by Number, but by Weight: and we will affirm, that the Quantity of Liquorice will be at the ſame Growth vaſtly greater in the diſtant than in the near Plantation.

We have ordered a ſetting Stick of a particular Form to be uſed for Liquorice, and with this Reaſon, that the Earth with ſuch a one is found to lie looſer about the Surface of the Root, which is a very great Benefit.

The common Inſtrument uſed for this Purpoſe is what they call a Dibble; this is the Handle of an old Spade, with a roundiſh Iron point. The Difference between this and the Implement we have ordered, is much more in Effect than Form. The Diſadvantage attending the Uſe of the common Dibble is this, that the Hole is made at once too large for the Set, becauſe of the Thickneſs of the Inſtrument: then as the Dibble is round, the Earth is more apt to fall in than when it is made with a ſquare Point. For this Reaſon when Liquorice is planted with the Dibble, the Planter when he has ſtuck the Inſtrument into the Ground, is obliged to work it round, in order to ſecure the Hole remaining open. This has two Diſadvantages, for the Hole being too big at firſt, is thus made much more ſo; and the Sides are caked and hardened like the Surface of a Clay Bank.

When the Set is put in, a little looſe Mould is thrown in about it, and a little more drawn over the Top; and this is all the Planter ever does, and often this but very ſlightly.

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The Conſequence is the failing of many Plants. The Liquorice ſet in this Caſe is in a kind of Well; which, when Rains come, naturally fills with Water, and this in the cold Mornings, that are frequent in the Beginning of MARCH, chills and damps it. Often it grows mouldy, and periſhes; often it is checked in ſuch a Manner, as hardly to recover it in a long Time; and very often it grows rotten in part, though it ſurvives the Damage upon the whole; but this Damage continues with it in the whole Growth afterwards. This is the Occaſion of the Failure of many a Liquorice Plantation, when the Owner attributes it to ſome very different Cauſe.

The better the Ground has been wrought, the leſs Miſchief comes this Way; for the leſs Time the Wet can lie in the Hole, and the ſooner the Earth moulders in at the Sides and fills it up, but ſtill it is ſome Damage; and who would not avoid it when that may be done ſo very eaſily.

Our Inſtrument perfectly ſets aſide the Danger. It need not be nearly ſo thick as the Dibble, conſequently the Hole is ſmaller, and better ſuited to the Slenderneſs of the Set; and there is this double Advantage in the ſquare Shape of the Point, that the Earth remains firmer when the Hole is firſt made, without working it about for that Purpoſe; and the Angles being ſmall, it the ſooner breaks in and fills up; cloſing exactly about the Surface of the Root. To this Purpoſe it is always beſt, if the Wood Part of the Inſtrument be made ſquare as well as the Iron Point, and with ſharp Edges. This, in well wrought Ground, opens a Hole juſt fit for receiving the Set; every Part of which immediately on putting it in, breaks and cloſes about it; ſo that the whole Root is lodged in a Bed of fine, ſoft, and pliable Earth, and is in the midſt of its proper Nouriſhment.

CHAP. LXVI.

Of the Management of Liquorice when in the Ground.

WE have left our Sets planted in Rows two Foot and a half Diſtance, and at a Foot and a half in each Row; their Tops furniſhed with good Eyes, and buried with about an Inch of good Mould. The Earth is finely to be raked, and the whole Surface of the Field left quite even; nothing appearing upon it. This is its Condition in the middle of MARCH, and thus it is to be left, expecting the Advantages of ſo regular and judicious a Piece of Huſbandry.

The Heads of the young Plants will quickly appear, and they are to be left to themſelves to make their Shoot.

Toward the latter End of Spring there will be Weeds in Abundance in the Intervals, and in the Spaces between Plant and Plant in the Rows. They will be leſs abundant afterwards, becauſe the Liquorice will be better eſtabliſhed; but theſe deep-rooted Plants do not draw the Nouriſhment away from thoſe ſlight annual Weeds, like thoſe other larger Growths that ſpread out nearer the Surface.

The Weeds are at this Time to be deſtroyed, and though this might be very eaſily done with a Hand Hoe, yet there will be more Advantage in doing it by an Inſtrument which cuts deeper into the Ground.

The ſucceeding Operations of this Kind muſt be more deep than this firſt need be, but the beſt Way of doing this is by two Inſtruments; a Breaſt Plow, and a Hand Hoe of a particular Form.

The Breaſt Plow is to be of the common Shape, only ſet to cut a little deeper; and the Hoe for this Uſe ſhould be narrow, ſharp, ſtrong, and moderately hooked. Both ſhould have a good ſteeled Edge, which may be well ſharpened; for the Ground in a Liquorice Plantation is ſo fine and looſe, that there is nothing to blunt them, and they may be worked with great Eaſe.

The Breaſt Plow is to be puſhed along the Intervals between Row and Row, coming near, but not too near to the Heads of the Plants; and the Hand Hoe is to cut up the Weeds between Plant and Plant in each Row. This is beſt done firſt, and the other afterwards; becauſe otherwiſe a great deal of the Advantage of the Breaſt Plow in breaking the Ground, will be deſtroyed again by trampling over it in the Hand-hoeing.

The ſame, and indeed greater Care muſt be taken that the Tops of the Liquorice Plants are not cut off in the Handhoeing among them, than in the working of the Breaſt Plow between them; for the Danger is greater as the Strokes from the Hand are leſs regular. And this Caution is very neceſſary; for the cutting off the Top is a great Stoppage in the Growth of the Root.

When the Weeds are thus turned in, being Annuals, they will almoſt entirely rot, and ſerve as Manure. There will be no Roots of perennial Plants in the Ground, for they will have been picked out in the ſeveral Dreſſings; the Seeds of theſe Annuals are continually coming in by Accident into the Ground, and they muſt be deſtroyed as they riſe.

As it will be ſome Time before any others riſe to a Height after this firſt Dreſſing of the Ground, there muſt be Care taken of them when they do. Not that the Breaſt-plowing is to be repeated. It will be ſufficient to ſend in Labourers with the proper Hand Hoes, and to have them cut up all that appear twice during the Summer; or if it prove a very rainy one, three Times.

This may be done at a very little Charge, and the only Care needful is to avoid cutting or wounding the Liquorice Plant. This will keep the Field clear during the Summer; and in Autumn, when the Leaves are fallen, it will be very well worth while to dig up the whole Ground one full Spit deep between the Rows.

Two Months after this digging, when all is ſmooth and even, let there be ſcattered a ſmall Quantity of very rotten Dung all over the Field. This will cover the Tops of the Plants, and defend them from the Severity of the Froſts, that

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are now to be expected; and the Rains that fall afterward, will, in a Manner, diſſolve the very Subſtance of the rotted Dung, carrying its Riches into the Heart of this fine looſe Earth, for the full Nouriſhment of the Plants. Thus let the Dung lie till Spring, and then taking an Opportunity of a Time when the Earth is between wet and dry, and will work eaſily. Let the Intervals between Row and Row be all thoroughly well dug again one good Spit deep as before.

This will bury the rotted Dung among the Mould, where it will ſtill work by its latent Fermentation, and break and divide as well as enrich it farther.

This done the Remainder of the Growth is only to be watched and hoed during Summer, and at Autumn the Earth is to be once dug between the Rows.

In this Manner the Liquorice is to ſtand three Years, and it will then be in the utmoſt Degree of Perfection.

It will perhaps fright the Farmer who has not been acquainted with the Profits of this Growth, to hear that his Land is to lie three Years for its Growth, and a great deal of Labour, and that of the moſt expenſive Kind, to be uſed to it during that Period: but it is only to his being unexperienced that this Concern will be owing, for the Profits of a Field of Liquorice are ſo large, that they over-pay abundantly the Time and Expences, compared with any other.

CHAP. LXVII.

Of the taking up Liquorice for Sale.

THE Time Liquorice Root takes from its planting, to grow to the utmoſt Perfection, is two Years and a half; that is, three Summers and two Winters, when we name three Years for the Time of the Grounds lying for it, 'tis including the Winter before the planting, when the Soil is preparing for the Reception of its Roots in Spring: this half Year muſt be counted by the Farmer, becauſe it is as entirely neceſſary to be beſtowed upon the Crop, as any Part of that wherein it is growing.

The Time of gathering the Roots for Sale, is late in Autumn. One reads in QUINCY's Diſpenſatory, and other popular Books, one Direction for Roots in general; where they ſay in the ſame Words, one tranſcribing from another, Roots are beſt taken up in Spring, for Reaſons obvious to all: if they had been as obvious to the Writers as they were expected to be to the Readers, I ſuppoſe thoſe Gentlemen would have named them: we ſhall ſet the Farmer right in this Reſpect, by giving him Directions juſt contrary; and as we never ſuppoſe him to know more than he is informed, we ſhall give thoſe Reaſons on which the taking them up in Autumn is founded, and this the more at large, becauſe they hold good in Reſpect of all other Roots.

Two Things are required in the Perfection of Roots, that they be full of Juice, and that the Juice be rich. On the firſt depends their good Condition, and on the other their preſerving that Condition. When they are flabby they are never full of Virtue, and when being plump and full their Juice is watery, it evaporates quickly, and the Roots loſe their good Appearance; and what is of great Conſequence to the Owner in moſt Inſtances, their Weight. Of this nothing can give a ſtronger Inſtance than Liquorice.

In order to try the Truth or Error of the popular Opinion, and to make the moſt of my Liquorice, I have taken it up at both Seaſons, and tried the Difference; what I have found is as follows.

In Autumn the Root is full, plump, and very firm to the Touch: its Colour is deeper on the Outſide, and the yellow within is clearer: its Juice is thick, and the Taſte ſweet.

In Liquorice taken up in Spring I obſerve that the Root is very plump and full, but it wants that Firmneſs which is in the other: it ſeems ſwelled, and is too tender and ſoft: its Colour is paler than it ſhould be on the Outſide, and it is of a muddy but pale yellow within. It is very full of Juice, but that is thin and watery, and the Taſte is leſs ſweet and leſs rich than in Autumn.

Theſe are Reaſons of great Weight why the Autumn ſhould be preferred for the Time of taking up this Commodity: but theſe are not all. I have found by the ſame Experience, that Liquorice taken up at Autumn will keep a conſiderable Time without waſting, loſing nothing, in a Manner, in its Weight; and retaining its full and plump Appearance; and at the ſame Time that it continues moiſt ſo long, it is little ſubject to mould or decay: on the other Hand I have ſeen, that Liquorice Roots taken up in Spring quickly change. They loſe a great deal of their Weight in a little Time, and will grow flabby, and often wrinkled on the Surface; and though the Weather be frequently more favourable at this Time, than at the Fall of the Leaf, yet they will ſooner grow mouldy.

This Experience ſhews; and I apprehend the Reaſon to be, that the Juices in the Root of Liquorice taken up in Autumn are rich, and of the Nature of the Plant, having in the greater Part been contained in its Veſſels, during a conſiderable Period of the Summer. Whereas I imagine, thoſe Juices which fill it ſo plentifully in Spring to be principally Water, juſt taken into the Root, and intended for the Support of the Stalk that is to ſhoot; a Part of them being in due Time to be converted to that rich and proper Juice, which ſwelling the Root in the End of Summer, contains in great Part the Virtues of the Plant.

Theſe ſeem natural Reaſons, and they are confirmed by Experience, for the Roots are every Way greatly preferable that are taken up at the End of Summer. In annual Plants which run to Seed, and in ſome of thoſe perennial ones which bear a very great Quantity of Seeds, the Root becomes greatly impoveriſhed after the Time of flowering; ſo that Autumn would be the worſt Time of all for taking up ſuch, but they are only a few, and Liquorice is not of the Number. The beſt Time of taking up ſuch

Roots is when the Stalk is just rising, for then they are full of those rich Juices which were intended to nourish the Stalk, Flowers, and Seeds.

Upon these Reasonings, countenanced by Trial, we recommend it to the Farmer who shall plant Liquorice, to take it up when the Stalks and Leaves are just withered and fallen. Then is his Time, for then it is fullest of Virtue, fittest for Sale, and if there be Occasion for keeping, it is in less Danger from thence.

The best Way is for him to have his Purchaser ready before he begins to take it up, and he will at this proper End of his Labours find, that if he have followed our Directions exactly, and spared none of the Expence and Labour we have recommended, the Produce will not be less than Seventy Pounds an Acre. This is a great Profit, and the Hazard is little or nothing.

To this general and particular Account of Liquorice, we shall subjoin a Letter written by a Planter of Pomfret, in the Year 1730, to shew the State of the Culture and Produce at that Time.

" Planters of Liquorice divide the Roots under two several Denominations: those they call " the Stocks, are the Tops or Crown Buds; " from whence the Liquorice Root is cut off: " the Runners are small running Roots, with " Eyes about two Inches distant from each other, " and run about two Inches below the Surface, " three or four Foot long. These Runners (before planting) are cut into Lengths of about " five Inches long, three Eyes to each Plant; " though two Eyes, if they are strong and good, " will do.

" If the Ground has not been Liquorice before, it must be trenched over, two Foot and " half, or three deep; the Roots in soft sandy " Earth, will run six Foot deep: the Ground " must be manured, or covered over with rotten " Horse Dung, which must lie a Month, or " more, to consume, before it is dug in. A little " Lime is requisite, if the Ground be strong: " but that is done after the Dung is dug in; " and the Lime must be turned in about ten " Days before planting; or else it will ferment, " and heave and thrust the Roots out of the " Ground again.

" Before planting you are to line out your " Ground, by a Rod of three Foot long, for " each Bed's Breadth, and within that Space " tread a narrow Alley, the Width of a Man's " double Feet, or both his Shoes going one by " another, moving strait forwards by the Line, " which makes this Direction, and which is about " a Spade's Breadth; with which also you are " to throw up the Earth out of these Alleys, " upon the Tops of the Beds; the Alleys to " be about eight Inches deep. Then draw up " the Sides of the Beds with a strong Rake; and " (as Gardeners term it) cog the Beds with it so, " as to make them round at Top: which done, " lay the Beds in three Rows; one Row on the " Middle of the Ridge or Bed; and the other " two on each Side, a Foot from the Middle; " and the Buds in the Rows at six Inches apart; " first a Stock or Crown Bud, and then three " Runners betwixt; then with a large Dibber, " made of the upper Part of an old Spade, " eight Inches in Length, as is used to plant " out Garden Beans, you are to plant out your " Buds and Runners; and beginning at one " End of the Ridge or Bed, take the Bud in " your left Hand, and the Dibber in your right, " make the Depth of the Hole the full Length " of your Dibber; then force the Bud with your " left Hand to the Bottom of the Hole; and " you are to close it, by thrusting of the Dibber down again Sideways, pretty near the same " Hole, as is done for Cabbage Plants, &c. And " so working towards the left Hand, it will go " on apace: those who practise such Works " much, will do it very expeditiously.

" The Sides of the Beds must be drawn up " just after the Buds are planted, so as that " the Holes which the Dibber left may be filled " up, in order to cover the Roots, and keep " out the Wet.

" The first Year after Liquorice is planted, " you may sow a few Onions and Carrots upon " the Beds, not to stand, but to draw whilst " young; and those but very thin: and as far " as you can reach with your Hand, you may " sow a few Radishes and Lettuce; and in the " Autumn you may also sow Spinage, which " grows very fine for the Spring following, and " which may be cut before the Liquorice grows " much, especially on the Ridge. The Profits " which arise from hence may, in this one Year, " be well computed at twelve Pounds ten Shillings an Acre; which we shall make appear " by-and-by, when we come to state the Debtor " and Creditor of this Commodity.

" Liquorice at Pomfret, and other Places, " is never in Perfection till it has stood three " Years; and many there be that let it stand " four, if it look heathful and lively: for Propagation, the Runners for Sets are sold by " the Stone, at the same Price as Liquorice itself is at that Time; but the Stock or Crown " Buds carry near double the Price. The Tops " are annual, growing the first Year about a " Foot high, the second Year two Foot, the " third Year four Foot; and those Tops are always cut off in Frosty Weather; which keeps " the Roots from tearing. The Green is best " to be clipped off with Garden Shears the first " Year, because of its being not so strongly " rooted as afterwards it will, when it may be " mowed with a Scythe. The Flowers come " out in August and September; but it very " seldom, or never flowers till the Plants are " three or four Years old: they are blue, and " hang out in small Tresses, like the Senna's, " but above three Inches long: the Stocks are " like those of Rasberries, only smooth, and the " Leaves like Seedling Ashes.

" Liquorice is taken out of the Ground from " Martinmas to the First of April; but the " latter Season is the best, both for the Liquorice and the Buds. When you take it up, " sort the small from the great; from which " last you are to dress the Chats with a fine " Knife: then lay them in Sand, one Layer of " Sand, and another Layer of Liquorice; but wet " not the Sand with any more Moisture, than just

" ſo as that you can hold it in your Hand with-
" out running out any Water; but it ought to
" be Rock Sand, ſuch as is dug out of Pits
" about POMFRET, NOTTINGHAM, and other
" Places. You are to order the Running Buds
" or Runners in the ſame Manner, if early taken
" up: but the Crown Buds will do, if thrown
" in a Heap, and covered with Mats, &c.

" The ſmall Liquorice is, for the moſt Part,
" dried on a Malt Kiln, after it is chopped ſhort
" with a Hatchet, or ſome other edged Tool, and
" then grinded to Powder in a Mill; which is
" the readieſt Commodity of all: Or elſe it is
" pounded in a Trough whilſt it is green, and
" put into a Maſhing Tub, and maſhed with
" cold Water two Days together: then it is to
" be wrung out clean, and the Juice boiled up
" in an Iron Pot to a black Subſtance, called
" SPANISH Liquorice, and at the Place before-
" mentioned, where it is raiſed, called Liquo-
" rice Cakes. The Cakes they make at POM-
" FRET are round and flat, with a Stamp re-
" ſembling the antient Caſtle of that Town, now
" in Ruins. Within the Top of which Caſtle
" there are two Acres of Land, at this Time
" employed in the Propagation of this noble,
" uſeful Plant.

" It is further remarkable, That one Acre of
" the Ground juſt mentioned, has yielded five
" Hundred Stone Weight, which is generally
" ſold for three Shillings and Six-pence per
" Stone, in one Crop: which muſt be accounted
" good Advantage; for in three Years it a-
" mounts to eighty-ſeven Pounds ten Shillings;
" which is little leſs than thirty Pounds per
" Acre, one Year with another. Nor is the
" Charge of Tillage ſo dear, by a great deal,
" as Hops and ſeveral other Improvements are.

" Before I finiſh this Account, ſays this noted
" Correſpondent, I cannot but remark, that
" about ſeven Years ago all the Liquorice at
" POMFRET was monopolized and engroſſed by
" a Set of Merchants, &c. But the Engroſſers,
" by ſending too great a Quantity together,
" found, to their Coſt, that it heated and ſmoak-
" like a Hay-Reek put up too green. Which
" I mention by way of Precaution to thoſe that
" raiſe great Quantities, who ought not to lay
" above two hundred Stone in a Heap; for
" though this may ſeem a great Quantity, yet a
" much larger has been taken up, and tranſport-
" ed, or kept in one Parcel.

" When Liquorice is to be tranſported, all
" that is deſigned for preſent Uſe is tied up in
" ſeven or fourteen Pound Bundles, neatly rolled
" up, and bound with Pack-thread. But the
" only Way to be taken is to ſend it by Water,
" and then to lay it in dry Sand, or any other
" dry Soil, a Layer of Liquorice and a Layer
" of Sand; ſo that the Sand runs all over
" it, and amongſt it; and ſo an Apothe-
" cary may keep it good for a Twelve-month
" in his Cellar. As for tranſporting of the
" Roots for planting, if the ſmall Eye Roots,
" or Runners and Buds, were ſo tranſported in
" Sand, it were better for them, than to be
" ſent naked; eſpecially if it be a great Way,
" and they are like to lie out of the Ground
" long. If for a Journey of fourteen Days, they
" may be ſent in Bundles cut ready for plant-
" ing; but if they are to be out of the Ground
" longer, then they mould and rot. They
" ſhould not be mixed Head and Tail, if you
" ſend them any Diſtance; but muſt be bound
" up in little Bunches, as above, and tied all
" one Way, for Readineſs of planting. As for
" the Crown Buds, they may be ſent by Sea,
" with a little Sand to them, being much hardier
" than Runners are.

" At the Town of POMFRET are about fifty
" Acres of Ground, called Liquorice Garths,
" many of them in ſmall Apartments, which
" entitle the Poſſeſſors to as many Votes for
" Members of Parliament, as they are poſſeſſed
" of thoſe ſmall Parcels of Land. All which
" cauſes the Land Tillage to be very dear, the
" common Labourers having one Shilling per
" Day, and two Drinkings, which amounts in
" all to at leaſt fourteen or fifteen Pence per Day.
" But there are many other Places, where it is
" found by Experience, that there is as good
" Liquorice raiſed, as at POMFRET, and where
" Men and Buds are very eaſily procured.

" As to the Expences of planting and pre-
" ſerving of an Acre of Liquorice, the Price
" of the Roots differ in proportion to the Price
" that Liquorice bears the Year you ſend for
" them: When Liquorice gives three Shillings
" a Stone, fourteen Pounds to the Stone, then
" Crown Buds give five or ſix Shillings per
" Thouſand; and Runners, cut into Lengths,
" and tied up in Bundles, give three or four
" Shillings a Thouſand.

" Old Planters of Liquorice reckon that
" eighty Thouſand of Plants will plant an Acre:
" But computing twenty Plants to a Yard, and
" four Thouſand eight Hundred Yards to an
" Acre, then an Acre requires ninety-ſix Thou-
" ſand, at one Hundred Sixty ſquare Poles to
" an Acre, thirty Yards to a Pole ſquare, and
" twenty Roots to a Yard; as may be ſeen in
" the Example.

160 Poles in one Acre,
30 Yards in a Pole,

4800 Number of Yards in an Acre,
20 Roots to a Yard,

96000 Total of Roots to an Acre.

" Now as they generally plant one Fourth of
" Stock Buds, and three Fourths of Runners,
" then there will be required,

	l.	s.	d.
24000 Stock Buds, at 5 s. per Hund. when cheap, —— ——	6	0	0
72000 Runners, at 3 s. per Hund.	10	6	0
The Charges of preparing the Ground will be about —— ——	4	0	0
Weeding, the firſt Year, about —	4	9	0
Weeding, the ſecond Year, for it is not hoed, but weeded by the Grub and Hand, at — ——	3	0	0
The ſame Operation the third Year, at	3	0	0
The taking up and bundling the laſt Year, at —— ——	3	0	0
The Charge in all, about ——	33	15	0

" So

" So that from what goes before, and what " will by-and-by follow, it is plain that an Acre " of Liquorice will, one Year with another, as " to the Debtor and Creditor of it, ſtand as in " the under-written Scheme, the whole being " taken at an Average for three Years.

DEBTOR.

	l.	s.	d.
Three Years Rent of the Ground, at 5l. per Acre	15	0	0
The whole Charges of planting, weeding, and gathering	33	16	0
To the Vicar for Tythe, at 2s. per Pound, i. e. 10s. per Acre for three Years	1	10	0
In all	50	6	0

CREDITOR.

	l.	s.	d.
Five hundred Stone of Liquorice, at 3s. 6d. per Stone	87	10	0
A Crop of Onions, &c. the firſt Summer	1	0	0
Some Winter's Crop for that Year	2	10	0
In all	91	0	0

Debtor and Creditor ballanced.

	l.	s.	d.
Debtor to Rent, &c.	50	6	0
Creditor in Goods ſold	91	0	0
	40	14	0

" Which is above ſixteen Pounds a Year " per Acre clear Profit, for the raiſing of Li- " quorice.

" To finiſh this Account it is plain, from " what goes before, that fifty Shillings an Acre " is allowed for the firſt Winter's Crop; but " if the Ground be ſowed with Michaelmas " Onions, Carrots, Lettuce, &c. there ſeems to " be no Reaſon why all the three Crops may " not be worth half as much, at leaſt, as the " one Summer's. And perhaps the ſame Me- " thods might be taken in other Winters, when " the Stalks are gone, as uſed to be done on " Beds, at leaſt, as it's uſed in the Alleys of Aſpa- " ragus Plantations. And by this it appears, " that if a Planter was poſſeſſed of a Hundred " Acres of Liquorice, and had a Vent for it, " it would bring him in near two Thouſand " Pounds a Year, clear of all Expences. But " an Hundred Acres is too much for one Man, " or in one County; and ſo no more of that.

" And thus, Sir, have I given you as good " an Account as I could, concerning the raiſing " of Liquorice at Pomfret, at leaſt as good " a one as the Time you gave me would allow; " though I am, I think, pretty ſure that there " is little or nothing omitted which is material, " and abſolutely neceſſary to be known in this " Affair. I wiſh you good Succeſs in all your " Undertakings,

And am, Your, &c.

J. P.

" P. S. Our Liquorice Garths take up ſo many " Hands, at the Time of Year, that there " are ſcarce any Labourers to be got, at any " Rate, for other Works.

CHAP. LXVIII.

Of Saffron.

SAFFRON is a little Plant, not cultivated for its Root, as the preceding, but for a ſmall Part of its Flower. It has an extreamly ſingular Aſpect when growing, at ſome Times of the Year having the Appearance of Graſs, from its narrow Leaves; and at the Seaſon of its flowering looking much more like a Garden Flower than a Field Plant. It is very much of the Nature of thoſe Flowers called Crocus, from its Latin Name; and it is itſelf not unworthy a Place among the Ornaments of a Garden.

The Root of Saffron is roundiſh, ſingle, and large. It is one of thoſe the Gardiners call Bulbs, in all Reſpects reſembling that of the Garden Crocus. It is covered with a brown Skin, and has a Tuft of Fibres growing from the Bottom.

From the Top of this Root riſe the Leaves. They are numerous, narrow, and long, like Graſs Leaves, and of a dark green Colour.

The Flower is ſingle, it riſes at the proper Seaſon from the Midſt of the Root, and ſtands but a little Height above the Ground, but it is very large. The Colour is a blueiſh Purple, and in the Midſt of it riſe thoſe particular Filaments, or Blades, which are the Saffron.

We have given the curious Reader a particular Account of theFlowers of thoſe ſeveral Plants raiſed for Uſe in Fields, and heretofore deſcribed; informing him of the Nature and Office of their ſeveral Parts. This muſt not be eſteemed a Matter of uſeleſs Nicety. We are to give the ſame Account now of the Flower of the Saffron, and without ſo much Inſight as the Farmer has by Means of the former Deſcriptions, got into the Nature of the ſeveral Parts of Flowers, it would not be eaſy to acquaint him what the Subſtance we call Saffron, which ſells at ſo great a Price, and for the Sake of which the Plant is cultivated, truly and properly is.

We have obſerved that the Flower of the Saffron Plant is very large. It ſtands in a Kind of Huſk, rather than a Cup, which is formed of one dry Piece, unworthy to be called a Leaf, and is the Sort of Covering the Botaniſts call a Spatha or Scabbard. The Flower itſelf is formed of one Leaf, which at the Bottom has the Shape of a Tube, but in the Body of the Flower is divided into ſix large oval Parts, equal in Size, and forming a Kind of hollow Veſſel, all being of equal Height and Breadth; within this Hollow riſe three Filaments, which are ſhorter than the Flower itſelf, and have each a duſty Button at the Top, of the Shape of an Arrow Head. In the Centre of theſe, and of the Flower, grows the Rudiment of the Fruit; this is of a roundiſh Form. On the Top of it ſtands one Filament, which is of the Length of the three juſt deſcribed, but inſtead of a ſingle

Button

Button on the Top, this has there three large Blades, which are rumpled and convoluted, and notched along the Edges; theſe are properly the Saffron. Some have ſaid that the Saffron is the Filaments of the Flower, but that is an erroneous Manner of Expreſſion; the Filaments are properly thoſe three Threads which riſe from the Bottom of the Flower, and ſupport the Buttons, in which is contained the Duſt for impregnating the young Fruit; but theſe three Blades are diſtinct from them in Shape, Nature, and Office. They grow from the Top of that ſingle Thread which riſes from the Fruit, and their Buſineſs is to receive the Duſt from thoſe Buttons of the Filaments, and convey it to that Thread through which it is to reach the Body of the Fruit, and penetrating into its ſeveral Cells, to impregnate the Seeds lodged therein. The twiſted, curled, and notched Form of theſe three Blades renders them very fit for the Purpoſe of ſtopping this fine Duſt, as it is ſhed on the burſting of the Buttons of the Filaments.

When this is done the Purpoſe of Nature is anſwered by theſe Filaments, the Buttons, the three Blades, and the ſingle Thread. Theſe all therefore decay and fall off, and the Body of the Flower with them. All that remains is the Rudiment of the Fruit, which now grows larger, ripens, and becomes of a roundiſh Form. It is compoſed of three Parts, and has three Cells within, in each of which there are ſeveral Seeds of a roundiſh Figure.

Theſe are Parts the practical Huſbandman has nothing to do with, for Saffron is propagated by Roots, not by Seeds, and his Care reaches no farther than to the ripening of thoſe three Blades, which grow from the Thread of the Fruit. The Time when theſe are in their full Perfection is the Period for gathering them, and that is juſt before the Buttons of the Filaments burſt to diſcharge their Duſt.

Saffron is a Native of many Parts of EUROPE, but not of ENGLAND, though it lives very happily with us by Culture; ſo happily indeed that the ENGLISH Saffron is allowed to be the fineſt in the World: and we are ſuppoſed, from the Excellence of that Article, to be able to make the famous VENICE Treacle, in as great Perfection here, as they can in ITALY. They have the Advantage over us in the Vipers, which are one Ingredient in that Compoſition, and are more full of Virtue as well as of Poiſon in the hotter than the colder Countries, but we have as much the Advantage over them in Saffron.

The ALPS and PYRENÆAN Mountains are the Places where Saffron is moſt frequent wild; we have a Plant not unlike it wild on the Sides of ſome of our WELCH Mountains. Dr. DILLENIUS has given a Figure of it, in his Edition of RAY's Synopſis of the Engliſh Plants, but it is not the ſame with the true Saffron: its Flower, which is of the Size of that of Wood Sorrel, grows on a Stalk whereon are ſeveral ſhort Leaves, this ſhews it to be eſſentially different.

We have obſerved that all Plants thrive better on being removed from a poorer to a richer Land, this is the Caſe with Saffron; for when brought from the bleak and barren Mountains of other Parts of EUROPE, to the rich and ſheltered Plains of BRITAIN, it out grows by many Degrees its natural Condition. To this is owing the Excellence of the ENGLISH Saffron.

CHAP. LXIX.

Of the proper Soil for Saffron.

SAFFRON, although one of the moſt profitable Articles in the Way of the Huſbandman's Profeſſion, is at preſent cultivated but in few Places. Some particular Parts of ESSEX, and the Neighbourhood of a Town thence called SAFFRON WALDEN, in CAMBRIDGESHIRE, are in a Manner the only Spots of this fertile Iſland, where it is raiſed. An Attempt was made not long ſince in SURRY, but without any great Succeſs: on enquiring of Mr. JAMES OGILVIE, who was a principal Proprietor, I found that the Ignorance of thoſe who undertook the Care of it, was the great Cauſe of the Miſcarriage. Let this caution the Huſbandman who ſhall raiſe it in any new Place, yet it need not frighten him from the Deſign. Saffron is a nice Article, but with due Care it is leſs hazardous than many others; and we ſhall lay down the Principles and Rules for managing it from the Preparation of the Ground, to the delivering it from the Kiln; that none who will be attentive, and beſtow upon it the Care ſo valuable and profitable a Crop requires and demands, can fail of Succeſs.

Saffron delights in a warm flat Situation, but being accuſtomed to Expoſure it will thrive better in open Fields than Incloſures. The Fences uſed about it are to be conſidered as erected for Defence, rather than Shelter, and are to be conſtructed accordingly; of theſe we ſhall treat hereafter.

The proper Soil for Saffron is a rich light Earth, improved by Manures; it may eaſily be too wet or too rank, but it cannot be too much enriched by mellow Dung, or too much prepared by Tillage. The better it is dreſſed and broken, the richer always will be the Crop.

A very rich Loam is an exceeding good natural Soil for this Growth, or a mellow Earth in which there is ſome Quantity of Sand, for that Soil alone is too often damp, and this is a Fault of the very worſt Kind, as it will deſtroy and rot the Roots of the Saffron.

For this Reaſon alſo Care ſhould be taken to examine the Bottom, for a leſs proper Soil, with a good Bottom, will favour the Growth more than a better, with ſuch as is bad underneath.

We have ſeen that for the Culture of Liquorice there is required a great Depth of good Mould, and that a hard Gravel is the beſt Bottom: for Saffron this Depth is not at all required, for this Plant roots very ſhallow; but the Nature of the Bottom is of very great Conſequence. A hard Gravel is proper for this as well as the other; but the worſt of all others is Clay. If it happen that this lie under a deep Soil it is very prejudicial, but if it be covered only with a thin Coat of good Earth, though that Coat would be very ſufficient otherwiſe, yet with the Clay Bottom it will by no Means anſwer. The Rea-

ſon of this is, that theſe Clay Bottoms hold Water a long Time, which is of all Things moſt prejudicial to Saffron.

Next to a Gravel Bottom Chalk is accounted the moſt favourable, this is the Bed that lies under the Soil in many Places above Saffron Walden; and none ſucceed better in their Crops than thoſe who manage that Kind of Land, other Circumſtances being equal.

CHAP. LXX.

Of preparing the Ground for Saffron.

SAFFRON requires to have the Ground prepared for it at ſome Expence. Indeed we ſee throughout the Courſe of the Huſbandman's Profeſſion, that the richeſt Crops require the greateſt Preparation. The Trouble or Expence in this is nothing, to be compared with that for Liquorice, but it is very conſiderable in Compariſon with that for many other Kinds; and we have obſerved before, that the Richneſs of the Crop will be according to the Manure and Tillage uſed on the Ground.

As Expoſure is an eſſential Thing to the good Growth of Saffron, the open Fields do better for it than encloſed Countries. In thoſe Places, as it is the Cuſtom to ſow two Years, and let the Ground lie Fallow a third, and as Saffron requires Land greatly in Heart, as well as carefully tilled, the beſt Method is to take a Piece of Ground that has been fallowed. This is the firſt Thing to be conſidered, the next is to take ſuch a Piece to chuſe as has had a Crop that has not greatly exhauſted it before. There is no Growth that exhauſts Land leſs than Barley; wherefore, when the Farmer has his Choice, let him prefer ſuch Land to any other.

The Piece being fixed upon, the Saffron is to be planted in the Beginning of July, but the Preparation of the Ground muſt be begun in March.

Toward the latter End of that Month let him begin by plowing, and to ſucceed perfectly he muſt ſet out right, plowing in a particular Manner: this will be more expenſive, but that he is not to regard. The Ground muſt be plowed deep, and the Furrows drawn very cloſe to one another. This is the Way to bring all the Parts of the Soil together, and to get them all quickly into a perfect and good Tillage, and this is what he is to attempt, at the ſetting out in his Work.

When the Soil is thus properly broken, and prepared for Manure, it is to lie ſix Weeks to enjoy the Benefit of the Dews, Rains, Sun, and Air. Theſe, after ſo thoroughly plowing, will operate upon it very ſtrongly; and it will, in the Period mentioned, be greatly broke and divided, and then is the Time of laying on the Manure. We have ſaid before, that this Manure muſt be well rotted Dung, and the Reaſons are of two Kinds; for firſt, if it were freſh, it would not mix with the Soil; and, ſecondly, in that Caſe it would be too ſtrong and rank for this tender Growth. The Dung being of this Kind, ſuch as has lain a good while, and been well turned; and the Land being rendered ſhort and brittle by the Expoſure to the Air after the laſt careful Plowing, they will readily enough mix together; and it muſt be the Farmer's chief Care, that the Mixture is made in equal Proportion, one Parcel of the Ground having no more of it than another.

The proper Quantity of Dung is five and twenty Load to an Acre. The firſt Buſineſs when this is brought in, is to make the Labourers ſpread it very carefully and equally over the Ground, and it is then to be once more plowed: this is to be done in the ſame careful Manner, and it anſwers the Purpoſe of the Spade in Gardening, the Dung and Soil being prepared as before directed, they will be mixed as thoroughly by plowing as by digging by Hand.

In this Condition the Ground is to lie till the third Week in June. It then begins to be Time to think of planting the Saffron, and the laſt Preparation for it is to be made by plowing again in this Manner. The Whole is to be very carefully turned and made fine, and between every Breadth of a Pole, that is ſixteen Feet and a half, there is to be left a broad Trench. This ſerves to divide the Lands, and for a Place where to throw in the Weeds.

When this is done, the Ground is prepared and laid out for the Reception of the Crop, and nothing remains but to defend it from Cattle and other Injuries. Hedges are not required for this Purpoſe, becauſe a ſlighter Fence will ſerve, and the Saffron will thrive the better for not being too much ſheltered. The beſt Fence is a Range of Hurdles; or if the Farmer prefer it, he may run up a ſlight dead Hedge; but in that Caſe he muſt take Care to keep it tight at the Bottom, for not only Cattle are to be kept out, whoſe treading would be deſtructive, but Hares, which are very fond of eating the Saffron Leaves.

When the Farmer has thus prepared, lined out, and fenced in his Ground, it will be the Seaſon for planting his Saffron. He will find that he has juſt made all ready at the Time when he is to lay the Roots into the Ground.

CHAP. LXXI.

Of the Choice of Roots for planting.

SAFFRON is planted by the Roots, which are always to be had in the Places where it is cultivated, for it encreaſes greatly. Once in three Years every Planter of this Herb takes up his Roots, and an Acre is found to yield him from twenty to thirty Quarters of clean ones. From theſe, the others who want, are to be ſupplied, they are ſold by the Buſhel, but there is a great deal in the Choice of them. The Owner picks out the beſt for himſelf before he ſells any to his Neighbours, and it is the Buſineſs of the Purchaſer to get after this as good as he can.

The firſt Article in the Choice is, that they be perfectly ſound. Some ſell them rough, as they are picked up out of the Ground; but this is a ſlovenly and careleſs Method often injurious

to

to the Owner, and always hazardous to the Purchaſer.

We ſhall therefore adviſe our Planter when he comes to this Article, to have his Roots picked and cleaned for himſelf; and we ſhall here direct him to purchaſe of ſuch as have uſed the ſame Method. If he cannot, he muſt take them as they run, but they ought to come ſo much the cheaper; and he muſt pick and clean them, and examine what they are, before he commits them to the Ground: for we would have him proceed with Certainty, and there can be none where many of the Roots may fail.

There are two Reaſons why the Roots ought to come much cheaper when bought rough, not only that many may be bad, but that there will be a great deal of Dirt, waſte Matter, and old Skins that will fill up the Meaſure. However, if the Price be proportioned to the Condition, and due Care taken afterwards in examining and cleaning them; ſometimes it may prove the beſt Purchaſe, for the careleſs Owner may thus ſell his beſt Roots, and the new Planter may get ſuch as he could not have bought from any one who had his Eyes open.

The Roots of Saffron are judged of two Ways, according to their Size and Weight, and to their Shape. The ſtrongeſt Roots are always the beſt, and theſe are the largeſt and heavieſt; therefore let the Buyer, in general, avoid as much as he can the little light ſkinny Roots; and when he looks over his Purchaſe, let him throw out the lighteſt, for it is better to loſe them, than to be diſappointed by depending on them.

Let him examine them by the Eye: they are beſt which when picked from the dead Skins have the ſmootheſt and brighteſt Coat. Then let him lay them in his Hand and weigh them, the heavieſt are beſt; and after this let him preſs ſome of them gently between his Finger and Thumb, and break others. In preſſing they ſhould be found firm and ſpringy, for when flabby, and without Elaſticity, they are in a Condition of Decay; when broken, they ſhould be full of a rich freſh Juice.

Beſide theſe Marks, there is a great deal in the Shape. The large and fine Roots are all rounded or flatted, and theſe ſmall ones ſhould be in ſome Degree of the ſame Form. They never can be ſo plump, ſo round, or ſo regularly ſhaped as thoſe full grown ones, but the more they reſemble them the better.

Many of them are long and run to a point: theſe are the moſt unlike the good Roots of any, and they are to be avoided accordingly. The People in the Saffron Countries diſtinguiſh them by the Name of Spiggots, and always reject them.

The Intereſt of the Farmer is, that as many as may be of his Plants flower the firſt Year, and on this depends the Neglect of the pointed Roots, for they never do ſo. The others often will flower when very ſmall: ſo that although the Size be a great Recommendation, yet the Planter needs not reject a very ſmall Root, provided it be of a right Shape, and freſh, plump, and thriving.

CHAP. LXXII.

Of planting the Saffron.

WHEN Saffron was leſs common, and the Roots were conſequently more ſcarce, the Planters uſed to ſet them at conſiderable Diſtances; but this, though an Advantage to ſuch Herbs as ſpread their Roots a great Way, is not eſſential to ſuch a ſlight Bulb as that of this Plant.

This being now underſtood, and the Roots plentiful enough, for they increaſe at leaſt one third in three Years in every Ground; they are now planted ſo near that about four hundred Thouſand are required for an Acre.

This ſeems a prodigious Number, but as they are ſold by large Meaſures, the Quantity that Way has not ſo vaſt an Appearance, ſixteen Quarters at an Average contain about four hundred Thouſand of them, and this is the moſt profitable Quantity the Farmer can plant.

We have brought him to the Beginning of JULY. He has his Ground perfectly prepared and fenced, and his Roots before him clean picked and examined, in this Proportion of a hundred and twenty-eight Buſhels to each Acre. We are now to inform him in the moſt advantageous Manner of planting them.

A Piece of three Acres is a very advantageous Quantity, or he may make the TRIAL with a ſingle Acre. If he chuſe to keep more Land in this Growth afterwards, three Acre-pieces are the moſt proper, for they are found upon Experience to be the beſt and eaſieſt managed.

The Inſtrument uſed for planting theſe Roots is of a particular Kind, but eaſily underſtood, and made from a ſhort Deſcription. It is a Spade made much narrower than the common Kind, and ſlighter; with a clean Blade and a ſharp Edge: it is only to work in Ground before made perfectly fine, ſo that there will be no Occaſion for Strength to cut through heavy Clods, as in the Work done by the common Spade. This Implement they call a Spit, or a Spit Shovel, and it is the only one needful in particular for this Article.

To every Man who has his Spit Shovel for opening the Ground, there are to be two Women allowed who are to have Roots in their Aprons. The Man goes firſt, and with his Spit raiſes three or four Inches of Earth, and throws it about half a Foot before him. The two Women follow, and dexterouſly taking the Roots one by one out of their Aprons, they place them in the fartheſt Edge of the Trench, which he makes in the Manner already mentioned.

The proper Diſtance of the Roots in this Row is three Inches: there is no Occaſion for an exact Meaſure, Cuſtom will lead the Women to do it very equally, when they have been once ſhewn what is right.

When one Row is thus laid in, the Spitter prepares for another, and at the ſame Time he covers theſe. The Method is this. He works croſswiſe of the Ridge, and when he has thus gone once a-croſs it, and the Roots are in, he begins from

from the Edge where he is, and works back again. He thus makes a new Trench as the firſt, and the Earth he throws up he turns in over the Row juſt planted. All the Care he is to take is, that he begin his Trench at ſuch a Diſtance from the Edge of the laſt where the Roots are planted, that it may be as far from the Roots to be planted in the new one to thoſe in the other, as it is from one to another of thoſe Roots in the Row: for the Meaning of his Work is, that there be an Edge of a Trench left by his ſecond Courſe a-croſs the Ridge, juſt three Inches diſtant from the firſt planted Row of Roots.

As he turns the Earth of this Trench over the Roots of the other, he will leave the Edge to be planted juſt in a Way to be covered in by the Earth of the next Trench, and ſo on. This is what he is to do at every return, croſſing the Ridge at every three Inches till the whole be finiſhed.

The Women follow him in every Trench juſt as in the firſt, and they leave the Roots planted, but naked, for him to cover; the next Trench affords the Means of covering them: and thus when the Spitter has gone through one Ridge he begins upon another, and ſo goes through the whole Land.

When he has done, all lies tolerably even, and the whole Piece of Ground is planted with Roots of Saffron regularly, at three Inches diſtant every Way.

This is no difficult Operation, but we have told the Huſbandman, that the whole Work in the raiſing of Saffron muſt be managed with exact Nicety and Care. Thus we ſhall tell him here, what the right and exact Method of the Spitter, and the Setters working is; and we recommend it ſtrongly to him to have an Eye himſelf over it, and ſee that it be done accordingly.

We have mentioned to what Depth the Spitter is to throw up the Mould in making his Trench, and we have adviſed the making the Spit with a clean Blade, and ſmooth ſharp Edge, that it may be done with Regularity. His Care muſt be to cut exactly and evenly to his Depth, and by that Means to have a level, ſound, and undiſturbed Bottom for the Roots to ſtand upon. If there be any haggling it will hurt their Growth; and as he knows on which Edge the Roots are to be placed, let him be very careful to keep the Bottom even there.

A good Workman with ſuch an Inſtrument, and in ſuch Grounds as we have deſcribed, will have a level Bottom as even as if it had been flatted by Art.

As to the Setters, there is but one Point in which they are to be careful; that is, to place the Roots directly and evenly upon their Bottom. It is in vain that an even Bed is made for them, if they are not placed evenly upon it. The great Care in the Art of Planting lies there, and if once ſo placed, the Earth that is ſo light in itſelf, and falls ſo lightly over them, will not diſturb them.

When Things are done in Haſte, they are ſeldom done with perfect Care. The Planters in the Saffron Countries are very ready and expeditious, but the Eye of the Owner ſhould be now and then upon them to ſee they do all properly. The Importance of the Crop is ſuch, that nothing can be more weak than his grudging this little Article of Trouble.

CHAP. LXXIII.

Of managing Saffron while in the Ground.

THOUGH a great deal of Care is needful to the profitable Management of a Crop of Saffron, it is not a continual Care. We have ſeen the Roots got into the Ground in the Beginning of July, and the Planter has no Occaſion to think of them again for two Months. His Fences are good, and his Roots well diſpoſed and deeply covered. They are then to be left to Nature; what they have to do is gradually to ſwell, to open thoſe Pores at which they are to take in Nouriſhment, to ſhoot ſome Fibres, and to receive the Juices of the Earth. This is a Work in which no Art of Man can aſſiſt them. Quiet is all they want, and the Courſe of Nature never fails, to be purſued regularly, when Man underſtands the Time, and does not intercept it.

In the Beginning of September there is Reaſon to believe all that I have deſcribed is accompliſhed. Fibres are ſhot out, the Body of the Root is replete with Juices, and the Intent of Nature is to be purſued in making the Shoot.

Something may be done at this Time to aſſiſt this important Operation, but the Period muſt be exactly watched.

The Ground being cleaned, and broke on the Surface, will wonderfully aſſiſt the puſhing of the Shoot; but if this be done too ſoon, the Earth that by its Lightneſs from the breaking, would ſo happily have aſſiſted in the forming and ſending up the Shoot will grow ſad again; and, on the contrary, if the Operation be deferred too long; that is, till the Shoot is got to ſome Length in the Ground, though it does not appear above it; the Inſtrument employed to make Way for the Shoots will cut them off, and the Damage will be very great.

The Huſbandman who is deſirous to obſerve all the needful Cautions, may aſk, How ſhall he know this exact Time? the Anſwer is eaſy. We have told him that in the Beginning of September he is to expect it; and therefore let him then examine by opening the Ground. Let him take up two or three Roots in different Places, and he will ſoon ſee whether they be in a Condition for the Operation or not.

It is needful that he make the Trial in different Parts of the Ground, becauſe from particular Accidents of Sun and Shade, or the imperfect Mixture of the Manure in ſome one Part of the Ground, if he made his Trial only in one Place, he might be deceived in judging from that of the whole Field.

The exact Condition of the Roots for this Operation, is when they have made their Shoot upwards, and it looks freſh, juicy and white,

and has its Point within an Inch and a half of the Surface of the Ground.

This is the true and exact Time, for it will be out of the Way of Hurt by the Inſtruments; and yet ſo near the Surface, that the Dews and Rains imbibed ſo freely, as they are by the new broken Ground, will enrich and feed it ſo, that the other Inch and a half will very quickly ſhoot, and a few Days more bring it all over the Field up above the Surface of the Ground.

The Operation to be performed at this Time is a careful Handhoeing. The Hoes for this Purpoſe ſhould be of the uſual Breadth, but a little ſtronger, well ſteeled, and ſharpened at the Edge. The Ground will be over-run with a young Growth of Weeds, but they will be all cut up and deſtroyed by this Operation.

The Hoers are to go in at one End of the Land, and Caution muſt be given them to tread lightly, and cut up carefully. Their Buſineſs is to cut about an Inch or leſs into the Ground, deſtroying all Weeds, and at the ſame Time looſening the Surface.

Theſe Hoers are to be followed by Rakers, who muſt have the ſame Caution of treading lightly; and muſt be directed to rake off all the Weeds cut up by the Hoers, into the deep Furrow or Trench we before directed to be made at the Edge of each Land for that Purpoſe. Theſe Rakers level the Surface again, ſo that when this Operation is over, the whole Field looks again like a Garden; with the Borders new dug up, quite plain and fine, and with no Plant upon it.

If there come gentle Showers after this rakeing, which is not uncommon at this Seaſon, the Owner may account himſelf particularly happy. His Field will in that Caſe remain but a very little while naked; and he will have the Pleaſure to ſee the Fruit of his Induſtry, in a riſing regular healthful Crop, that promiſe a Profit which it would be very difficult for him to obtain from the ſame Expence, and the ſame Labour, employed on any other Article whatſoever.

This we may ſay to him in general to promote his Induſtry and Attention, that the more Pains and Care he takes about any Crop, the greater will certainly be the Return in Proportion; and that if there be ſome in particular which require more than others, they are thoſe which beſt repay it.

CHAP. LXXIV.

Of the gathering of Saffron.

THE Huſbandman will underſtand the Reaſon of that ſtrict Caution we have given him, not to wound, bruiſe, or cut off the Top of the Shoot, when he ſhall be informed that this Shoot is the Rudiment of the Flower itſelf; whence all the Profit of the Crop is to be derived. An Injury to this would be irrecoverable, and it is therefore we have been ſo cautious in warning him to take Care of it, at the Time when he is hoeing the Ground, to ſupply it with freſh Nouriſhment, and to deſtroy the Weeds that would elſe drain off a Part.

This Practice of hoeing is the more eſſential, in that there is nothing at this Time to receive the Nouriſhment which it ſupplies but the Flower, and no Part of the Flower ſhews ſo plainly the Effect of a plentiful Supply, as thoſe three Blades which are the Subſtance called Saffron. They will ſhew themſelves in the Flower, however poor and mean the Plant may be; nay whatever Diſadvantages there are, theſe three Blades will always appear, not only in their due Number, but of their natural Length; but they will be thin and light in poor Ground, and they will grow fat, thick, and rich, in proportion as the Soil is naturally better, or is more improved by Art, whether the Method be by Manure or Tillage. Therefore this taking all Means to ſupply the Roots with Nouriſhment in the Beginning of SEPTEMBER, when they are riſing to flower, is of all Things the moſt eſſential in the Management of Saffron; not only the Weight, that is, the Quantity of the Produce in pure Saffron, depends upon this Richneſs and Fatneſs of theſe Blades, but its Virtue in a great Meaſure, and its good Appearance in the Cake entirely. The Price of the Saffron therefore, as well as the Quantity, depend upon this Article. We repeat and urge it the more now, that we have an Opportunity to explain it as an Introduction to the preſent Chapter on the gathering, that the Huſbandman may ſee the Neceſſity and Conſequence of doing it thoroughly and carefully.

We have told him that a few Days after this hoeing will ſhew him the young Shoots of his Crop, and that their Regularity will make a very pretty Appearance, a very little Time more will ſhew him theſe Spires all opening into Flowers, and then the Proſpect is agreeable indeed. The Saffron Plant is, as we have ſaid, one of the Flowers called Crocus's; and it is inferior to few of them in Beauty. We ſee the Field is, according to our Method, planted with all the Regularity of a Garden; there is not left the Leaf of a ſingle Weed in it, by the Hoers and the Rakers; and the Flowers now open in all their Glory. A Sight pleaſing in the greateſt Degree to the Owner, who with the Beauty ſees the Advantage.

As ſoon as the Flowers are open they are to be gathered. The Reader has been informed already, that it is only a Part of the Flower which is the Saffron, that is therefore to be picked out and ſeparated; but this is a Buſineſs that may be performed at Home; therefore 'tis not neceſſary to attempt it in the Field. The whole Flower is to be gathered there, and the reſt is to be done afterwards.

The Sun and Air have a great Effect upon the Flowers, and even upon the Leaves of Plants; we ſee them firm and plump in all their Parts in a Morning, when they are full of the Refreſhment of the Dew; at Noon, if the Sun have Power, they flag and grow lank; and toward Evening they begin to recover their Look of Health and Vigour again.

This natural Change, according to the Periods of the Day, affects nothing more than this Plant; and it affects no Part of this ſo much as the

Blades within the Flower. Theſe are plump, turged, and full of Juice in the Morning; they grow thin and poor by Noon, and they do but indifferently recruit themſelves in the Evening, the Completion of this is reſerved to the Dews of the Night; and therefore the early Morning is the only Time in which they are to be found perfectly fine. From this the Planter is to learn what is his true Time of gathering the Flowers, and how much depends upon it. He muſt ſend in a proper Number of Hands at Day-break into his Field, as ſoon as the Flowers of the Saffron appear, and theſe muſt gather till about Nine o'Clock in the Morning: they may, in Caſes of Neceſſity, ſtay an Hour longer at their Work, but this is not ſo advantageous.

It is happy for the Owner that all the Flowers of the Saffron in his Field, do not appear together. We have obſerved, in cautioning him about watching the Time of hoeing, that little Accidents may occaſion ſome Plants in the ſame Field to be earlier, and ſome later than others; and there will be the ſame Difference in their flowering. This is a great Advantage: it would be impoſſible, if they all burſt forth together, that they could be gathered properly even by any Number of Hands; but theſe little Accidents which happen in every Plantation, protract the Time of flowering for ſeveral Days; ſo that thoſe of one Morning being gathered, there is a freſh Supply open for the next, and ſo on, till the laſt have flowered.

It is farther happy alſo for the Owner, that there is no exact Degree of opening, at which theſe Flowers muſt of Neceſſity be gathered. The Saffron is beſt of all in thoſe which have the Segments juſt ſeparated at the Tops, that is, in ſuch as are juſt opening into the full Bloom, but they may be gathered before or after this Period. In general all thoſe Flowers which diſtinguiſh themſelves by their full Colour, whether they are fading or not quite opened, are each Morning to be gathered.

Here, as in all other Parts of this Product, there is to be a great deal of Care uſed, otherwiſe there will be a great deal of Loſs and Damage.

We have ſaid that a proper Number of Gatherers muſt be ready at Day-break. Each of theſe muſt have his Baſket on his Arm, and no other Preparation is neceſſary: but let there be Care taken who they are. Drunken Labourers are at all Times to be avoided, but they are to be dreaded on this. There is great Danger, that in gathering ſuch a Part of the Saffron as is fit for that Purpoſe, more may be trodden down. The Want of Light, and the Careleſſneſs of the Gatherers, are the two Things be dreaded. Happily this Work falls out at a Time when People are ſober, if they ever be ſo; but there are ſuch thorough Sots that they ſhould be examined. Though they are ready at Day-break they muſt not be ſent into the Ground till it is well light: they are then to be poſted in different Spots; and ordered to gather all the Flowers about them: firſt ſhewing them how near the Plants ſtand, and explaining to them the Miſchief of trampling them down.

As theſe People pick up the Flowers one by one, they are to throw them lightly into their Baſkets. All the Art of gathering them is, that they lay hold on the lower Part of the Flower. The Reaſon of this is, that the Flower comes off more entire when taken by this Part; and there is alſo this farther Cauſe for not touching it near the Top, that the uſeful Blades grow in the upper Part, and might be injured by the Preſſure.

Toward Nine, or half an Hour after Nine, as we have ſaid, the Gatherers ſhould deſiſt. The Care of the Farmer in this Article, is to adapt the Number to the Work. If they be too few they muſt ſtay till they have done, even if it keep them within an Hour of Noon; but as there is a Loſs to the Saffron in this, he ſhould take Care to ſend in a larger Number next Day.

The next Morning all are to be ready at the ſame Hour, and the gathering is to be performed, in all Reſpects, in the ſame Manner, and this is to be continued regularly till the whole Quantity of Saffron have flowered, and all its Produce has been regularly collected.

While they are thus employed, from Day to Day, without Doors, there is to be no Idleneſs within. The picking is there to be going forward all the while, as we ſhall ſhew in the next Chapter.

CHAP. LXXV.

Of the picking the Saffron out of the Flowers.

EVERY Morning there will be a Quantity of Flowers brought into the Houſe. The Baſkets of the Gatherers, which have been lightly filled, are to be as lightly emptied, that no Injury may be done to thoſe three Blades, which are the eſſential Part of the Flower.

The entire Flowers are to be ſcattered over a large Table, round which ſeveral Perſons can ſit in the Way to pick: four Forms are the beſt Convenience for that Purpoſe, and every Picker ſhould be allowed free Room for the Uſe of his Arms.

The very ſame People who were employed in the Morning as Gatherers, may be ſet to work, during the reſt of the Day, in picking, for they will not be wanted again for that Service till the next Morning; and he is an ill Manager, who does not contrive to have all the Saffron gathered in the Morning, picked during the Day.

The Method of picking is to take the Flower by the Bottom, between the Thumb and two Fore Fingers of the left Hand, and laying hold of the String that riſes from the Embryo of the Fruit, juſt below where the Blades of Saffron grow from it, between the Thumb and Fore Finger Nail, to nip it off there; this Part is to be laid by, and the reſt of the Flower thrown away as uſeleſs.

From time to time a Sweeper ſhould clear away about the Pickers Feet, ſweeping off the Flowers they have thrown down; and every Picker ſhould have his or her own Diſh, that the Owner may look on at Times, and ſee each does his Part in the

the Buſineſs, and that all do it right. I have ſeen great Irregularity when half a dozen People picked into one Diſh, one laying the Fault, when diſcovered, upon another; but when each works ſeparate, though all are at the ſame Table, the Senſe that he is to anſwer for what he does, without Colluſion, will keep him diligent.

The proper Part to be picked out, we have obſerved, is the three Blades of each Flower, and here we ſhall obſerve, that there may be Faults on either Side. That of Careleſſneſs in Servants is moſt frequently the Caſe, they not taking out the whole Body of theſe Blades; and on the other hand, the Avarice of the Maſter makes him ſometimes inſiſt on their taking out more, nipping off a Piece of the Filament to which they grow, along with them, by laying hold of it too low.

The firſt defrauds him of a Part of his Quantity, which in an Article of the Price of Saffron, is greatly to be regarded; the other debaſes, in ſome Degree, the Value of the Saffron, while it adds very little to the Quantity.

In order to prevent Injury from the firſt, the Owner muſt have his Eye continually upon the Work, and ſometimes look into the picked Saffron in the Diſhes, and ſometimes into the waſte Flowers thrown down upon the Floor. There is a certain Way of knowing when the Work is rightly performed, this is by obſerving the Bottoms of the Blades. Let the Farmer remember the Deſign is, that theſe be all nipped off together, by pinching off the Top of the Filament juſt below where they are inſerted. Now he will eaſily know if this be punctually done. For if the three Blades do not hold together, they have been taken off too high, and he has loſt a Part of his Saffron: on the other hand, if they have been taken off too low, he will ſee a long String to which they grow, hanging from their Baſe, by which he knows he has more than he ſhould, to the damaging, in ſome Degree, the Beauty of his Saffron. The Injury this Way is not very great, for the Colour of the Filament, though fainter than that of the Blades, is not diſtinguiſhed eaſily, when it has been preſſed and made up among them in the Cake; but the Buyers of this Commodity are now ſo good Judges, that he cannot be too careful.

It is proper to obſerve, that the Pickers have long and ſharp Nails on the Fore Finger and Thumb of the right Hand, otherwiſe they pinch it off in an aukward bungling Manner, always cruſhing the Filament to which the Blades grow, and too often the Blades themſelves. The People who expect to be employed on this Service, in the Saffron Countries, know the Uſe of preſerving theſe Nails long and in good Order; and they commonly do it at this Seaſon, but as every little Article in this Matter is of Conſequence, the Owner will do well, eſpecially when he ſhall propagate Saffron in a County where the Labouring People are not uſed to it, to beſpeak his Gatherers and Pickers in Time, and caution them to let theſe Nails grow for this Service: it will anſwer their Purpoſe as well as his, for they will go through their Work with more Eaſe and Convenience to themſelves, as well as more Regularity, by being thus provided againſt the Time, with the natural Implement for the Buſineſs.

We have adviſed the Owner to viſit his Pickers from time to time, and look carefully into their Diſhes; but he may and ought alſo to look into the Flowers they throw down as uſeleſs, for he will diſcover, by the Condition wherein they are left, as well as by the Saffron picked out of them, the Honeſty and Care of the Pickers.

If he ſee the Filament riſing from the Embryo Fruit left at its whole Length, or very nearly ſo, and its End pinched off clean and ſharp without bruiſing, he need not look into the Diſh of that Picker to ſee his Saffron; for 'tis certain from this, that the valuable Part is taken out clean, entire, and well. On the other hand, if he find Parts of the three Blades remaining on the Top of the Filament in ſome of the Flowers, and a great deal of the Filament nipped away in others, he will know by what has been ſaid already, that in the one Caſe he is defrauded of a Part of his Produce, and in the other he has a diſadvantageous Addition.

It will be proper, for the diſtinguiſhing who works well and who otherwiſe, that he make every Picker throw down his Flowers in a Heap ſeparate from the reſt, as well as collect his Saffron into a particular Diſh. By this Means he will not only ſee when Faults are committed, but always know who commits them.

This careful Inſpection will alſo keep the People at their Duty, and make thoſe honeſt through Fear of Detection, who would not be ſo in Principle. None but he who has ſeen and obſerved it, can conceive the Difference there is between Servants who work under the Eye of a careful Maſter, and thoſe who are in the Pay of a negligent Perſon, that leaves them to themſelves. To be rich the Farmer muſt be careful, and this he may ſet down as a certain Rule, that he will always have his Buſineſs done well as cheap as he can have it done amiſs; the only Difference is his own Trouble.

CHAP. LXXVI.

Of the drying of Saffron.

WHAT we have deſcribed as the Courſe and Manner of picking Saffron for one Day, is to be conſidered as applicable to every Day. We have ſeen the People ſent out to gather the Flowers that were riſen in the Morning, unloading themſelves two Hours before Noon, and employed in picking out the Saffron during the Remainder of the Day. The next Morning they are to be ſent out into the Field, to gather a freſh Parcel of Flowers, and in the ſame Manner are to be employed the reſt of the Day in picking them. Thus they are to proceed till the whole Crop of Saffron be gathered, and the whole Quantity of the Blades, or uſeful Part picked out. This is all their Buſineſs, ſo we ſhall ſpeak no more of that Part; but we muſt conſider what is to be done with this Saffron they have thus picked. We left it in their ſeveral Diſhes, ſeparated as clean, and kept as pure as the nice Eye of the Owner could obtain it, and

and we are now to inform him in what Manner, and by what Aſſiſtances it is to be prepared for Sale.

Rich and Fat as theſe Blades of Saffron are, they would ſoon dry if left to themſelves in that Condition. This would rob them of a Part of their Virtue; and of a great deal of their Weight.

The Owner is to ſell them according to the Weight, and will have a Price proportioned to their Condition, with Reſpect to their retaining their Beauty and their Virtue. The Method of preparing them for Sale, ſo as to retain both theſe Properties, is by preſſing them together into large Cakes, by the Aſſiſtance of a ſlight Degree of Heat. This forms them into compact Maſſes, which remain in a damp or ſoft Condition, retaining the full Flavour and Colour they had while in the Flower; in this Condition they will, with due Care, keep many Years, and it is thus the Druggiſt or Dealer expects to buy them; and he will always give a Price proportioned to the Degree of Perfection with which this Work has been performed. All that regards the Management of Saffron is nice, but this is the moſt nice of all. Some Heat is abſolutely needful, but ever ſo little beyond the due Degree is hurtful; and a little Careleſſneſs in the Management of it may burn the Saffron, after which no Art can ever bring it to be worth any thing.

The drying of Saffron is effected by Means of a Kiln, but this is of a very eaſy Structure, and ſmall. We have ſaid extream Care is neceſſary in the Management of this Commodity in every Article; but it will be ſeen, in the Courſe of the whole Preparation, that very little beſide Care is neceſſary; therefore let not the Owner, who reaſonably expects ſo large a Profit, ſpare that.

Before we enter upon the Management of the Saffron at the Kiln, let us acquaint the Owner with the exact Structure of the Kiln itſelf.

In the firſt Place, it ſhould not be erected in a fixed Manner, becauſe it will be moſt convenient to move it from Place to Place; and the Degree of Fire to be uſed in it is ſo moderate, that there is no Need of hard or heavy Materials.

Firſt let the Huſbandman provide a large, broad, and thick Plank. Let him ſupport this upon four ſtrong Legs, that it may ſtand firm, but not fix theſe to the Floor, nor the Plank to the Wall: let it be as a moveable Table, that he may carry it any where, as he ſhall have Convenience or Occaſion. The Legs are to be ſhort, and ſo contrived that they may ſtand very firm and ſteady.

The Outſide of the Kiln is to be made of eight Pieces of ſound Wood, about three Inches thick, in Form of a Frame upon the Plank.

This Frame is to grow gradually wider, all the Way from the Bottom to the Top, which is to be done by ſetting the Pieces ſloping. Its beſt Breadth at the Bottom is about two Foot; and it ſhould be near two Foot at the Top. The Height of it ſhould be about equal to the Width at the Top. Two and twenty Inches high, and two and twenty Inches broad at the Top, and twelve Inches at the Bottom, is the uſual Dimenſion of the Kiln for Saffron in Cambridgeſhire; and by all I have ſeen, this Size and Proportion is ſo convenient, that it would be idle to think of making any Innovation.

On the Foreſide of this Frame there is to be made a Hole eight Inches wide, and about four Inches above the Surface of the Plank. The Uſe of this is to introduce the Fire. And over all the reſt there is to be a Covering of Laths, theſe are to be of the beſt and eveneſt Kind that can be procured; and Care is to be taken to lay them regularly, evenly, and pretty cloſe together; they are to be nailed to the Frame we have juſt named, and then they are to be plaiſtered over on both Sides. The Planks are alſo to be covered very thick at the Bottom with the ſame Plaiſter, which when dry makes a Kind of Hearth and Sides for the Reception of the Fire. A Hair Cloth is to be ſtretched over the Top or wideſt Part, which is what they call the Mouth of the Kiln: this is to be fixed to the Sides of the Frame, and alſo to two Rollers, or moveable Pieces of Wood, which are turned by a Kind of Wedges, and ſerve to ſtrain and tighten the Hair Cloth on Occaſion.

When the Kiln is thus far prepared, let the Huſbandman lay in Readineſs a couple of ſmooth and tolerably thick Boards, a little larger in Length and Breadth than the Top of the Kiln; and with theſe a clean thick Blanket, and a Quire of clean white Paper.

All Things being now in Readineſs, let a Quantity of ſmall and fine Charcoal be ſet by the Kiln, to make and keep up the Fire, as Occaſion ſhall require. This muſt be clean and free from Knots, and in this Choice of it a great deal of Danger is avoided. The plaiſtered Bottom and Sides of the Kiln will very well bear the due Quantity of Fire for this Purpoſe, nor will they be injured, whatever be the Condition of the Charcoal: but this is not the Caſe with the Saffron, that requires not only a very gentle, but a very equal Heat: it is very eaſily damaged; and no Fuel will keep up ſo equal and quiet a Heat as fine even grained Charcoal, ſuch as is knotty, and of the Nature of what they call in London old Coal, is fiercer, but that Quality is not wanted on this Occaſion: there it burns irregularly, the Knots being always leſs charred, by Reaſon of their Hardneſs, than the intermediate Parts. From this it happens that the Fire, with the ſame Quantity of Fuel, is ſtronger at ſome Moments and weaker at others, which will affect the Saffron irregularly, and the knotty Parts often crack and fly, the Sparks from which will be apt to burn the Hair Cloth, and do other Damage.

Every thing being now in perfect Readineſs, let the Huſbandman proceed in this Manner. Let ſome Charcoal be lighted, and ſtand in Readineſs to put into the Kiln: then let half a dozen Sheets of Paper be evenly laid upon the Hair Cloth: upon theſe let the picked Saffron be laid three Inches thick, and ſpread very evenly and regularly, but juſt as it comes from the Pickers Hands, and without any preſſing; that is to come afterwards, when the Saffron is more in a Condition to bear it, and is to form it into thoſe thin and compact Cakes in which we ſee it.

When the Saffron is thus ſpread to a proper Thick-

Thickneſs upon the Papers, more Sheets of the ſame Paper are to be ſpread evenly over it; and then the Blanket is to be folded and doubled evenly, ſo as to bring it to a little more than the Size of the Top of the Kiln. This is to be laid upon the upper Range of Papers, and then the Fire is to be put into the Kiln. A few Pieces of the ready lighted Charcoal are firſt to be put in at the ſquare Hole in the Front, left for that Purpoſe; and upon and about theſe are to be laid more Pieces, all of them of that even and ſmooth Kind already deſcribed, and all of them ſmall, for large Pieces light unequally and burn unequally, ſo that it is never poſſible to keep the Fire at any regular Standard, which is a Thing very eſſential in this nice Work.

Chemiſts know this Article of keeping up a regular ſmall Fire, by Means of ſmall Charcoal, perfectly: none underſtand the Management of Fires like them, and therefore all others ſhould learn of them on this Occaſion. When they have very nice Operations to perform, they firſt break their picked Charcoal into Pieces of the Bigneſs of a Wallnut, or thereabout: and this is the proper Method of acting in this Article of drying the Saffron.

As to the Degree or Quantity of Fire, it muſt be proportioned to the Quantity of Saffron to be dried. 'Tis almoſt impoſſible to convey any Notion of this Matter in Words, becauſe we have not a ſufficient Variety of them; all the Terms on this Occaſion being compriſed in two, great and little: the Fire muſt be of the latter Kind, but yet it muſt be enough to affect the Saffron; the beſt Method of acquainting the unexperienced in this, is to tell him what is the Deſign of it. The Thing to be done is not the drying the Saffron at once, for that would utterly ſpoil it, what is needful is to give it ſuch a Degree of Heat at firſt, as will diſpoſe it to grow damp. This is a certain Conſequence of its being warmed and covered up, and this is what the People in the Saffron Countries call ſweating of it. Now we have informed the Huſbandman that this is the Degree of Heat required to be given it, he will not find it difficult to judge what is to be the Strength of the Fire. He will ſoon find, by the Condition of the whole, whether it be too much, too little, or juſt right; and will accordingly diminiſh, encreaſe, or continue it in the ſame State.

The firſt Hour is the moſt critical, the moſt nice, and moſt hazardous of all the Time of drying. We name this that the Owner may be properly upon his Guard.

The Fire is required to be ſtronger at firſt than at any other Time, though then but moderate, and let the Owner keep this in his Mind, for if becauſe he hears it is to be ſtronger then than afterwards, he exceeds the Bounds of Caution, he will ſcorch all the Saffron, and it will be good for nothing afterwards.

What is called the ſweating of the Saffron, is the raiſing ſome Moiſture out of the Blades, by Means of a gentle Heat, which being detained by the Covering of the Paper and the Blanket, is returned upon the Saffron again, and there works by ſoftening and mellowing the Blades; ſo that they are, after a Time, diſpoſed to unite on a gentle Preſſure, and to form together one compact Cake.

As this is the Intent, the Proceſs is to be managed accordingly. When there has been ſuch a Fire as ſerves to ſweat them properly, continued for half an Hour, the Board we have before directed to be kept in Readineſs is to be laid over the folded Blanket, and a large Weight is to be laid upon this. The mellow and ſoft Matter is now preſſed by Degrees; and preſently, from a Body of three Inches thick, as it was at firſt, is reduced to an Inch in Thickneſs.

The Fire is now to be a little leſſened, and there will be enough to continue the ſweating in a moderate Degree, for ſo much is not required now it is under Preſſure, as was while it lay looſe. The Heat and Preſſure now operate together upon the damp Saffron, and the Cake continually becomes thinner and more compact, and is kept in a Condition of Moiſture wherein it blends perfectly in all its Parts; ſo that it advances, by Degrees, toward the Condition, wherein it is to be finally made up; when this Degree of Heat has been kept up an Hour, the Huſbandman is to turn his Cake of Saffron. This he is to do in the following Manner.

The Blanket and Board, with its Weight, are all to be taken off, and the Papers, which are then the only Covering of the Saffron, are to be raiſed up, looſening the Saffron where it ſticks to them: this done the Papers are to be laid on again, covering the Cake as before, and then a thin Board is to be thruſt in between the Hair Cloth of the Kiln, and the lower Parcel of Papers: theſe are what were firſt ſpread upon the Hair Cloth, and now lie cloſe under the Saffron. When a Board is compleatly got under theſe Papers, the Cake of Saffron lies upon it, and may be eaſily turned. This is to be done carefully, and the whole, with the new ſpread upper Papers, is to be laid evenly upon the Hair Cloth of the Kiln; when that is done the Board that ſerved for turning it is to be taken away, and the Blanket, doubled as before, is to be laid over it; the Board for Preſſure is to be laid over that, and the Weight put upon it.

Every Thing is now in the ſame Condition as at firſt, except that the Cake is turned, and the ſame Degree of Heat is to be preſerved in the Kiln, that there was the laſt half Hour, which is ſomething gentler than the firſt half Hour. In this Manner the Cake is to lie one Hour: at the End of that Time the Weight, Board, and Blanket are to be taken off as before, and the Cake is to be raiſed, freed from the Papers, and examined. If there be no Miſchief done now the Danger is over, for theſe two firſt Hours have all the Hazard; for the reſt of the Time, as leſs Heat is needful, all the Care neceſſary is frequent turning.

We ſuppoſe the Cake of Saffron very well managed, and to have paſſed through the Operation of the two firſt Hours. It is then to be turned and laid on again, as before, and a gentle Heat kept up. This Heat muſt be preſerved as equally as can be for two and twenty Hours, and the Saffron muſt be turned every half Hour during that Time: when this is over, the Saffron is in the right Form, and is fit for Sale. It is to be

wrapped up in a Bladder, oiled on the Outſide, and that to be again wrapped up in Leather, and the whole in Flannel. This Care keeps it in the due Condition, till required by the Purchaſer, it remaining moiſt, tough, and in perfect fine Condition; without the Loſs of Colour, Taſte, Weight, or Virtue.

This is ſufficient, if there be a ready Market upon the Spot, but if the Owner be obliged to keep it ſome time, the only proper Security is to put the whole Parcel thus wrapped up and covered, into a Leaden or Tin Box, in that Way it will keep Years.

This is the whole Management of Saffron, and we apprehend we have delivered it in ſo plain a Manner, that if the moſt unexperienced will regard every Part of the Account, we may promiſe him he will run no Hazard.

CHAP. LXXVII.

Of managing the latter Gatherings of Saffron.

WE have told the Huſbandman he is to ſend out his Gatherers every Morning, ſo long as any Number of Flowers appear upon the Saffron Field; and we have informed him that, according to various little Accidents, there will be ſome Plants forwarder and ſome later than the Generality of the reſt, by ſeveral Days; and that even what may be called the Generality of the others do not riſe together, but Day after Day.

On this depends a Diſtinction between the better and a worſe Kind of Saffron: As to thoſe Flowers which open before the Generality of the others, they are finer than the reſt, for their Forwardneſs is owing either to the Strength of the Roots, or the particular Richneſs of the Spot of the Field where they ſtand. The Fineneſs of theſe Flowers conſiſts in the Largeneſs and Plumpneſs of the Chives, and theſe Flowers may ſtand to be gathered with thoſe of the ſucceeding Morning, if not enough to ſend in for alone, becauſe thoſe rich Blades will ſupport themſelves in good Condition for ſome time after the Flower is open.

Theſe are the richer Kind of Saffron, and they are mixed with the reſt, giving a Value to the whole.

On the other Hand there are Quantities of the Plants that ſtanding on poor Spots, or under Shelter, or from the Smallneſs and bad Condition of the Roots, flower much later than the Generality of the reſt. As the Blades conſtituting the Saffron are in the more forward Plants richer than the reſt, they are in theſe poorer, and conſequently it is not to the Advantage of the Owner to mix them with the reſt of his Produce; becauſe, as the firſt add to the Value of the whole, theſe would diminiſh the Price, more than their Quantity would make Amends. Neither could he conveniently do it, were his Intereſt on the other Side.

He is to look upon theſe late Gatherings therefore, as a particular Kind of Saffron, inferior to the reſt, and conſequently to be made up ſeparately; but ſtill it is very well worth his Care, the very worſt Saffron bringing a large Price in proportion to any other Produce.

We have explained to him what theſe laſt Gatherings are, and now ſhall proceed to direct him in their Management.

Let him make the Gatherers take up every Flower in theſe, as well as the preceding Mornings; and let him ſee all picked with the ſame Care as the others. When this is done, upon examining the Diſhes, he will find the Difference between this and the former Parcels, they have been compoſed of large, fair, plump, and juicy Blades; but thoſe in the Diſhes now will be found ſmall, thin, and much dryer; this is the Poorneſs of Saffron: it is always the Conſequence of the Plant's not being well nouriſhed. If at any Time the due Preparation of the Ground ſhould have been neglected, every Part of the Produce would be of this poor Kind. We ſhall ſhew the Owner how that is to be managed, and the ſame Rule may ſerve him, if he is ſo unhappy as to have a whole Field in this Condition.

In this Caſe he is to prepare the Saffron in this Manner. When the Blades are picked out, and the Kiln is ready, he is to ſpread his Papers over the Hair Cloth, and then lay on the Saffron, as before directed, to the Thickneſs of four Inches inſtead of three, for the thicker this Parcel of the looſe Blades is ſpread, the thicker will be the Cake: and there is nothing ſo advantageous to poor Saffron, as to be in a thick Maſs. The thinner it is the ſooner it loſes its Colour and Moiſture, there is none has ſo little, and therefore none can ſo ill ſpare it; and nothing betrays its Poorneſs, or reduces its Price, ſo much as the Dryneſs, or, as the Buyers call it, the Harſhneſs of the Blades.

The Way to prevent this in the Cake is, to lay in enough at the firſt ſpreading. There is no Loſs in this, for all that is put in remains; and 'tis as well to have two larger, as to have three ſmaller Cakes, while the larger are always, in equal Circumſtances as to other Reſpects, the better.

When the Saffron is thus ſpread, the next Thing in the fine Kinds is to cover it with other Papers and the Blanket; but in this a little ſmall Beer muſt be ſprinkled in among it, from the End of a clean Bruſh, ſuch as the Painters uſe.

The ſmall Beer ſhould be clear and ſtale, and a Bowl of it ſtanding by, the Bruſh is to be dipped in, and when taken out and drained a little, the Handle is to be ſtruck againſt a Stick, held in the Left Hand, by which Means the Beer that is left among the Hair will be ſcattered in very ſmall Drops among the looſe Saffron.

The Fire is now to be put in, and ſhould be rather leſs than is uſed for the fine Saffron. The ſprinkling with the Bruſh is to be repeated from time to time, till there be a good deal of Beer got in and perfectly mixed, and the Effect of the Heat begins to raiſe a little Steam from it. At this Time the upper Papers are to be laid on, and the Blanket upon them, and ſoon after the Board and Weight. Then the whole is to remain not an Hour, as the finer Kind, but only about five and forty Minutes, when the Board, Blanket,

Blanket, and Papers, are to be taken off, and it is to be turned as the other Kind.

The Quantity of Beer muſt be enough to moiſten the Blades, without any running from them, and in this Management it will ſerve in the Place of that natural Moiſture they ſhould have; and they will ſweat and ſoften, and blend together, in a Manner like the fine Saffron, which they would not have done otherwiſe for want of due Moiſture. Many Things have been tried, but none anſwers this Purpoſe ſo well as Beer. I have known ſome uſe Water, but that ſubjects the Cakes to mould afterwards; others have uſed White Wine, but that draws away the Colour of the Saffron, and gives it to the Papers; others have uſed Ale, but that is too clammy; upon the whole it is a very nice Article, and of all the Things that have been tried, or perhaps ever can, there does not ſeem to be any that will anſwer ſo well as the old plain Country Practice of ſmall Beer. This is a little ſtrengthened beyond Water, and it has a little Clammyneſs, theſe are enough, it will not grow mouldy; it does not rob the Saffron of its Colour, and it gives a Toughneſs which is ſufficient without overdoing that Article.

The Cake thus managed is to be dried, in every Reſpect, in the ſame Manner as that of the finer Saffron; but it is beſt to keep the Fire throughout as it begun, a little more gentle than for the other, and to let it lie ſix or ſeven and twenty Hours in drying.

The pooreſt Saffron, thus managed, yields a thick, maſſy, and firm Cake, all the Blades of which are well mixed and blended together, which has a deep Colour, a good Conſiſtence, and ſtrong Smell. It muſt be kept in the ſame Manner as the other, but the Owner is to expect about a fifth Part Abatement in the Price. The Difference will be more if he has not managed it well; but he may always ſell it thus if he follow carefully theſe Directions, avoiding the too careleſs wetting it at firſt, and burning afterwards.

CHAP. LXXVIII.

Of certain Particularities in the preparing of Saffron.

WHAT we have ſaid of the wetting the poor Saffron, may be continued to the whole Art of managing it: ſome have attempted to alter the Kiln, and introduce new and particular Methods for the drying and curing of the Cakes, but by all that I have ſeen they are worſe than the old Way; and whatever judicious People I have known concern themſelves with them, have returned to the old Practice at laſt.

The firſt Improvement that was attempted, was to lay a Net-work of fine Iron Wire acroſs the Top of the Kiln, inſtead of the Hair Cloth. This was ſaid to have great Advantages, of which the principal was this, that the Saffron dried faſter, and with a ſmaller Quantity of Fuel.

This is true, but we have ſhewn the Huſbandman in many an Article before, that there are Savings which are the greateſt Loſſes. As to the Fuel uſed in drying Saffron, it is too trifling an Article to deſerve naming; and as to the other Article of Time, what is the beſtowing a Day and Night upon a Parcel of a Comodity the Value of which is ſo great.

The Diſadvantage that frequently attends this Method, is more than all the Good it can boaſt, by many Degrees, the Saffron is not enough defended from the abſolute Force of the Fire, in this Way, but burns if there be not the moſt exact Care taken, and often in ſpite of all the Care that can be.

The Cake it is true dries quicker, but that is a Fault; it dries too quick, for the great Benefit of the caking this Commodity, is the Time it will keep moiſt and good in that Condition, and that is the Effect of that thorough ſoaking it gets in the ſlow drying. For theſe Reaſons, tho' we have named the Iron Wire Way, for the Pleaſure of thoſe who love Variety, we adviſe the Huſbandman to go on in the uſual Manner, and prefer his Hair Cloth.

A ſecond Improvement is, the uſing Linnen Cloths inſtead of the ſeveral Parcels of Papers that are laid over and under the Saffron; there does appear to be a Poſſibility of making an Advantage of this, for the Linnen falls cloſer, and preſſes more perfectly upon the Saffron than the Paper can do; but we are not got at the compleat Management. The Cuſtom at preſent is to lay a Parcel of Papers upon the Hair Cloth, then to ſpread the Linnen over them, and upon that to lay the Saffron, which they cover with the other Linnen, and then lay on the Blanket; but there is an Inconvenience in this, for the Saffron dries too haſtily at Top, and frequently has the Marks of the Cloth on both Sides, which hurt the ſmooth and rich Appearance of it, and are not eaſily got off again.

This is not to be rejected therefore, as the Wire Covering, but improved; and the Method I ſhould propoſe to the Huſbandman's Trial is this.

Let him have a few Sheets of thin fine Paper, ſuch as in LONDON is ſold under the Name of thin Poſt, and ſome Quires of the common cheap Sort beſide. I have found that for this common Kind, what are called the Outſide Quires of printing Demy, are the fitteſt, they are large and ſmooth, and not too compact. Theſe may be bought for about Four-pence a Quire, and if there be ſome imperfect Sheets among them the Matter is not much.

I would have the Huſbandman ſet out with ſome Quires of this, a few Sheets of the thin Poſt, and a couple of Pieces of middling fine Cloth; each ſo large as, when doubled, to be of Size of the Hair Cloth. Let him alſo have his Blanket and other Matters in Readineſs, as on other Occaſions, and then let him proceed in this Manner. Having ſtretched his Hair Cloth, let him lay upon it ſome Sheets of the Demy Paper, on theſe let him lay one of his Cloths doubled; and when he has ſpread and ſtroaked this ſmooth with his Hands, let him lay evenly upon it as much of the fine Paper as will juſt cover it, cutting it into Pieces for that Purpoſe, ſo as to

make an even Bed for the Saffron, without Rumplings, or the Marks of folding.

On this let him lay his three or four Inch Thickneſs of Saffron, according as it is of a finer or an inferior Kind, and then let him cover the Saffron with another even Bed of ſingle fine Paper, and lay the ſecond double Linnen Cloth over that. Upon this let him lay on other Sheets of the Demy Paper, and then the Blanket. This done let him proceed in the Manner as already directed.

He will by this Means have the Advantage of the Linnen, which is a real Improvement without its Inconveniences, and he will preſs his Saffron into a fine Cake, without the Marks of the Texture of the Cloth.

A third Variation in the Management of Saffron at the Kiln, is the uſing a ſtuffed Pillow inſtead of the Blanket, for covering it. We name this under the Title of a Variation, becauſe it by no Means deſerves the Title of an Improvement: for it has not one Advantage over the other Method, but is in every Reſpect worſe. The Pillow, in this Caſe, is to be made of Canvaſs, and filled with Straw. We need ſay no more about a Thing which we ſo utterly condemn.

CHAP. LXXIX.

Of the Papers uſed in drying Saffron.

WE are here to mention an Article dependent upon the Saffron Trade, in which the Owner has an Advantage, but in which the Abuſes are ſo very great that, in Point of Honeſty, he ought to be upon his Guard, to diſcountenance ſuch as practiſe them.

We have obſerved that Papers are, in the common Way of drying, ſpread immediately under, and immediately over the Saffron. Now the Preſſure which connects the Blades of Saffron into a firm Cake, cannot fail to diſlodge ſome of their Juices: theſe are of a very rich Colour, and they ſtain the ſeveral Papers, penetrating through them as they lie one over another.

Theſe Papers, eſpecially ſuch as have lain next the Cake, whether above or below, are ſtrongly impregnated not only with the Colour, but the cordial Virtues of the Saffron, their Taſte manifeſts this; and they very readily communicate their Colour and Qualities to Liquors poured on them.

The Diſtillers have ſeveral Cordial Waters, Uſquebaugh of the yellow Kind, and the like, which the good old Receipts order to be coloured with Saffron, or more properly ſpeaking, they order Saffron to be put into them for its Cordial Virtues, and the fine yellow Colour comes in Conſequence.

The Diſtillers finding that there were Papers thus ſtrongly tinged with Saffron, in the common Way of curing that Commodity, bought up theſe Papers and coloured their Liquors, ſaving the Price of ſo dear an Article as Saffron.

Had the Abuſe ſtopped here the Matter had not been very great, but the next Step was, that the Apothecaries, or rather thoſe Retailers in London, who call themſelves Chymiſts, and very unhappily for the Buyer, rob the Apothecary of that Part of the Profits of his Profeſſion, took theſe Papers into their Hands.

Theſe Perſons are ordered by their Diſpenſatories, to make a Syrup of Saffron, by infuſing a large Quantity of Saffron in ſtrong White Wine, and then melting the fineſt Sugar in it; but they pour a Pint of boiling Water upon a Couple of Sheets of this Paper, and ſweetening the ſtrained Liquor with two Pound of middling Sugar; they ſell this as Syrup of Saffron. They are ordered to make a Tincture of Saffron alſo, of the fineſt Saffron infuſed in Wine, or any ſtronger Liquor; but for this Purpoſe theſe People only dip ſome Saffron Papers in Wine, or Spirit, till the Liquor is yellow enough, and this is Tincture of Saffron.

In the ſame Manner they uſe theſe Papers on many other Occaſions, defrauding the Sick of that Help the Judgment of his Phyſician would have given.

To repreſent this Matter in its ſtrongeſt Light to the Cultivators of this Commodity, I ſhall tell them what is abſolutely a Fact, that the Saffron Trade is greatly hurt by this; and that it would be their Intereſt to join in a Reſolution, that no Saffron Paper ſhould ever be ſold again. This can only be done by a joint Reſolution to deſtroy all of them; and I am convinced that if they would have the Spirit, they would find the Price of Saffron riſe in one Year, ſo as to make them Amends for what they would loſe in the Sale of the Papers: the Demand muſt be greater, and the Trade would every Way feel the Benefit of it.

If this cannot be brought about, let me adviſe the Owner, for his own Sake and for the publick Good, to avoid thoſe wicked Artifices which are uſed by too many, to give more Colour to the fainter Papers. This is done with other Ingredients, not with Saffron. I ſhall not name them, leſt I give Inſtructions for a Practice againſt which I write: but certainly ſo much of this Artifice is uſed at preſent, that the Quantity of what are called Saffron Papers, uſed annually in London, is ſix Times as much as all that are fairly produced in a Year. And this I mention as a farther Caution to the Saffron Owners, for it is ſtriking at the very Root of the Trade. They are very ſenſible that the Demand is not what it uſed to be, and they may be aſſured this is the Reaſon.

CHAP. LXXX.

Of the Produce of a Field of Saffron.

THE firſt Year affords the Huſbandman but a moderate Advantage in this Article, in Recompence for his Care and Expence; nay ſometimes the Crop for that Seaſon is ſcarce worth the Charge of gathering, picking, and curing; but he is to underſtand, that a Field of Saffron is planted for a three Year's Continuance, and that it is from the ſecond and third of theſe Seaſons he is to expect that great Advantage

vantage we have told him there is in raiſing this Commodity.

Nothing is more uncertain than the Quantity that ſhall be produced the firſt Year, ſometimes from a Rood of the Land there ſhall not be gathered above a Pound or two of freſh Blades, and ſometimes leſs than this; ſo that it will not pay Charges; but from this to about ſeven Pounds from the Rood, is the moſt general Produce: and at an Average, where every thing has been rightly managed, and the Seaſon moderate, the Owner may expect about five Pounds. This will yield about one Pound of Saffron prepared, and ready for Sale.

This Produce of the marketable Saffron from the wet Blades, is to be reduced to great Exactneſs. In general, if the proper Care be uſed in the ſeveral Articles already mentioned, the Owner may thus expect one Pound of ſaleable Saffron from every five of the firſt Gatherings, and about a ſixth Part leſs from the Pickings of the laſt Flowers; thoſe who uſe Ale have found, that leſs than five Pounds of the poor Blades will yield a Pound, but this is owing to a Part of the clammy Moiſture of the Ale being left in the Cake, and the Price is reduced more than the Encreaſe of Quantity compenſates: on the other hand, ſix Pounds of the ſame freſh Blades go to make a Pound of the pure Saffron, in the Way we have directed; and this is a Proof the ſmall Beer dries away, only ſerving to moiſten and ſweat the Saffron, and leaving little behind in the Cake.

The Time that a three Acre Field of Saffron will continue flowering, is in general from the firſt to the lateſt, about four Weeks. Three Weeks of this yield the fine rich Saffron, and the laſt Week only is what we call the laſt Gatherings, or yields the poorer Blades of Saffron which require that artificial Management we have named.

We have ſaid that the great Profit ariſes from the two laſt Crops of Saffron; but the Owner is not to underſtand by this, that the Produce of thoſe two Years is equal. The ſecond yields a vaſt Quantity in proportion of the firſt; and the third is the richeſt of all. The Produce of Saffron by the Acre, taking in all the Methods of Advantage we have named, may be very moderately ſet down at four and twenty Pounds of marketable Saffron for the two laſt Years, reckoned together. The firſt we have ſeen bears no Proportion to theſe at all, but this, as we ſhall ſee hereafter, is a vaſt Profit: ſo that we have not exceeded the Bounds of ſtrict Truth, when, in order to ſpirit up the Huſbandman to make the Culture of it more univerſal, we have preferred it to moſt other Crops.

CHAP. LXXXI.

Of the Management of the Saffron Field the two ſucceeding Years.

THE Owner of a new Saffron Ground, who has gathered his firſt Crop, is to know, that notwithſtanding the great Expectations to be formed of the two following, he has very little Trouble or Expence to come, the Charge and Labour of the firſt Year was his great Article in this Way.

We have conducted him to the planting, managing, and gathering his firſt Crop. The Roots retain their full Vigour afterwards, and the Ground having been ſo thoroughly prepared, will ſupply them with Nouriſhment without farther Aſſiſtance: all he is to do is to deſtroy ſuch Weeds as would draw it from his Crop, and to preſerve the Roots from Injuries as they lie in the Ground.

For the firſt Purpoſe he muſt have the Land hoed, according to the former Directions, and eſpecially regard the Seaſon for the firſt ſhooting of the Roots for flowering. This Time muſt be found by taking up a few as before, and the Operation performed in the ſame Manner: as to the latter Article, he has no Care upon his Hands but to keep his Fences good, that the Cattle, and particularly the Hares, be kept out, for they are very apt to infeſt the Saffron Fields in Winter.

As to the gathering, picking, and preparing the Saffron, it muſt be exactly the ſame in theſe ſucceeding Years that it was in the firſt, only as the Owner has been told that his Crop will be much larger, he muſt employ a greater Number of Labourers; and as he has more at Stake, he ſhould not grudge to be more careful himſelf, in the over-looking every Part of the Work.

What we have ſaid as to the preſerving the Roots quietly in the Ground, will ſeem to contradict a Cuſtom the Saffronmen have in ſome Places, of turning in their Cattle after the Leaves are fallen, to feed upon the Weeds that grow among them. But as much as our Directions contradict that Practice, juſt ſo much does that Practice run counter to Reaſon. In the firſt Place we have told the Owner, that nothing is of more Benefit to Saffron than hoeing; this is to be performed at a moderate Expence, and if repeated at proper Times there will be none of this Growth of Weeds, becauſe it will deſtroy them: and in the next Place, if this have been omitted, and there be a Growth that may ſerve the Cattle a little, their Feet will diſturb the Roots, and harden the Soil; ſo that it will much better anſwer the Purpoſe to ſend People in to mow them down occaſionally, and give them elſewhere.

According to the Principles of Tillage, on which we have founded the whole Subſtance of this Work, nothing can be more beneficial to any Crop than the breaking and dividing the Ground while it is growing. Whatever Advantage there may be in this, the ſuffering it to be trod down by Cattle has juſt a contrary Effect; for as the one looſens and divides it, the other tramples it into more Compactneſs.

Upon thoſe Principles, the longer a Crop is in the Ground, the more it will ſtand in Need of this Operation; and the richer that Crop is, the more it will deſerve it: now Saffron, as we have ſhewn, is to ſtand three Years, and is one of the richeſt Crops a Ground can bear; for theſe Reaſons hoeing ought to be frequently repeated.

The more Nouriſhment is drawn away by Weeds, the leſs is left for the Saffron; and the more compact and firm the Ground is, the leſs Benefit it receives from the Sun, Air, and Rains. Therefore let the wiſe Huſbandman frequently hoe his Saffron Fields, he will ſo give a much larger Share of Nouriſhment to the Ground, and by deſtroying the Weeds that would devour it, he will make it all go to enrich the Saffron. The Richneſs of the Saffron goes, in a very great Meaſure, to the filling the three Blades, which are its great Produce; and in Conſequence, the more he hoes the Ground the heavier they will be, that is, in the plaineſt Words, the more Saffron he will have at the Time of gathering. Nor is he to ſuppoſe this Difference in Quantity will be confined to any little Advantage. The Charge of hoeing more frequently than his Neighbours will coſt ſomething extraordinary, but of this he may be aſſured, that he will gain two Hundred per Cent. upon all the Money he ſhall expend in this Manner, in the Quantity and Excellence of his Saffron; this he will find by comparing the Produce of his Fields, with that of his Neighbours who have gone on in the uſual Way. It is certain, upon the whole, that as there are few Articles in the Province of the Huſbandman, that are ſo profitable as the Culture of Saffron, ſo there is ſcarce any in which there is Room for more Improvement. We ſee that the new Methods of Horſehoeing is not propoſed here; but the common Ways of Management are only directed in a more profitable Manner. Let the Huſbandman obſerve the ſame Conduct in every other Article, and he will not fail to enrich himſelf, to the Surprize, though not at the Expence, of his Neighbours.

CHAP. LXXXII.

Of breaking up a Saffron Ground.

THE Huſbandman has been informed that his Saffron is to ſtand three Years, and he has been conducted in every Article of its Management during that Time; we are now therefore to ſuppoſe the third Crop gathered. The Plantation has done its utmoſt, and he is to break up the Ground. The Profits he has obtained would naturally make him very unwilling to give up ſuch an Article of his Profeſſion, but he is very far from being under a Neceſſity of doing it, he muſt take up his preſent Plantation, but he is in a better Way than ever to begin another. He is now in the Condition of the Perſon from whom he bought his Roots, and as he will be able to ſupply others with ſuch as are to ſpare, he will know how to keep the beſt for himſelf.

The Nature of Saffron is like that of other bulbous Roots to encreaſe, and a Part of its Encreaſe he can now ſpare: but whatever may have been his Profits in his firſt three Years, he may promiſe himſelf much greater in the ſecond Period; becauſe he now ſets out with more Knowledge than he had firſt, and he will be at all the needful Expence and Care with more Freedom and Spirit, from his Experience. As he will therefore not fail to chuſe his Ground properly, and dreſs it well, and will ſet out with ſuch a choice Collection of Roots as he never could have got by Purchaſe, he may now look forward, and promiſe himſelf not only a much larger, but a much more certain and continual Gain.

He is now to ſet about the taking up and tranſplanting his Roots, and either uſing all to enlarge his Stock, or ſelecting what Quantity of the beſt he pleaſes, and diſpoſing of the others as he at firſt bought them, to reap a certain Advantage.

If he chuſe to enlarge his Plantations let him firſt ſeparate his Roots, the finer from the inferior, in the ſame Manner as if it were for Sale; and let him throw away the worſt. When he has made this Diviſion, let him plant his large and fine Roots in one Field, and his ſmaller and inferior for a new Growth by themſelves in another. He will find this much more advantageous than raiſing them together.

In his Deſign of enlarging the Saffron Plantation, let him conſult all Particulars: that may be often profitable in itſelf, which is not practicable by particular Perſons; and that may be profitable in one Degree, which is hurtful in another.

For theſe Reaſons let the Farmer who is about to enlarge under this Article, conſider his other Circumſtances; let him ſee whether he muſt not neglect ſomething eſſential, to fall ſo largely into this Particular; and finally, let him conſider the Number of Hands that are wanted on this Occaſion, and where he ſhall find them. We do not mean by this to diſhearten him from the Deſign of enlarging his Saffron Grounds; but would have him ſet about it with Diſcretion. We are ſenſible that the great Profit may tempt him to exceed the Bounds of Caution, in following it; and for that Reaſon lay theſe Hints before him, that if he find he cannot conſiſtently with his other neceſſary Affairs, manage a larger Crop than his former, he may content himſelf with the ſame Quantity of Ground, for that will now yield him a larger Produce and require a larger Number of Hands in proportion; or if he find he can have Opportunities, and Hands for a larger Quantity, that he may proportion his Undertakeing, not to the Golden Expectation of Profit that is before him, but to the Nature and Convenience of his other Affairs: nothing would perplex him more than to have a larger Plantation of this Kind, than he found at the Seaſon he could manage. And beſide the Vexation of Mind, nothing would be ſubject to a greater Loſs; for the gathering and curing of Saffron is a Thing that cannot be delayed when it is ready.

Hoping theſe Cautions may reſtrain within due Bounds, that Spirit of enlarging the Saffron Grounds, which ſo naturally riſes after the gathering of the laſt Crop, we ſhall proceed to the Method of taking up, managing, and replanting the Roots.

The laſt Gathering being over, and the Saffron cured for Sale, let the Field be carefully plowed up. The Farmer muſt ſee that he ſend in a careful and honeſt Fellow for this Service, as well as a good Plowman. He muſt be told, if unacquainted with this Article, the Depth at which the Roots lie, and he muſt take Care to

cut beneath them that he do not injure them, and that he turn them all up: twelve or thirteen People are to be ſent in to follow the Plow, and to pick up all the Roots they ſee turned up: each of theſe is to have his Baſket upon his Arm, to toſs the Roots into it as he gathers them from the Ground; firſt giving them a gentle Stroke againſt the Outſide of the Baſket, to ſtrike off what may happen to ſtick in Lumps about them.

When the Plow has been thus carefully thro' the Ground, and the Roots collected after it are brought in, the whole is to be harrowed twice over with a good well tined Harrow. This will penetrate four or five Inches into this light Land, which is as deep as the Roots lie; and conſequently it will bring up all, or the greateſt Part of thoſe which the Plow turned under the Mould. The ſame People are to follow in the ſame Manner as they followed the Plow, picking up every Root they ſee: and I have generally obſerved, that by that Time the Field has been twice harrowed, and the Harrow well followed each Time, there is hardly a Root left in it. Theſe Roots are to be carried to the reſt, and thrown together on a large Floor, where careful and experienced People, if ſuch there be to be had, are to be ſet to pick and clean them: if not, 'tis no great Difficulty to teach the moſt ignorant; and whether theſe or the others are employed, it will always be proper for the Owner to have an Eye upon them.

What is to be done has been in general named before, it is only to clean the Roots from Earth, from dead Parts, and from old Skins or other Foulneſs; but this is the proper Time alſo to ſeparate the fine from the others. The Cleaners ſhould be told to throw them as they work into two ſeparate Parcels; the large, plump and full into one Heap, and the ſmaller and leaner into another.

When the Roots are thus cleaned, they will keep good for ſome Time; but the moſt advantageous Method is to plant them out immediately, and that upon freſh broken Ground.

The Huſbandman who has thus far purſued the Culture of Saffron, ſhould uſe every Method to farther his Advantage, therefore what he ſhould do is this. Knowing the Time when his Roots are to be taken up, he ſhould have a freſh Piece of Land well choſen, and thoroughly prepared according to the preceding Rules, ready for the laſt working juſt at that Time. While his Roots are picking and ſeparating, he ſhould give it the laſt Plowing, and immediately after ſend in the Spitters and the Setters; giving to the laſt his choiceſt and fineſt Roots, with all the needful Cautions of placing them regularly and evenly on their Bottoms.

Thus purſuing the exact Courſe we have before laid down for him, he will in this choice Field have his fineſt Roots diſpoſed with the greateſt Regularity, in the moſt favourable Soil that is poſſible.

This Foundation laid for his great Crop, let him with the ſame Care plant his leſſer Roots in his ſecond Field; and he will be ſurprized at the Produce of the firſt, and perfectly ſatisfied with that of the latter.

We ſhould obſerve here, that as there are certain Variations in the Manner of drying the Saffron, ſo there are in the Article of breaking up the Ground. Some inſtead of plowing uſe a particular Inſtrument called a Pattock: this is a kind of forked Hoe, or prong Hoe, with ſharp and ſtrong Points; but by conſtant Obſervation upon the Effects each Way, I altogether give it for the Plowing.

This Inſtrument is very apt to wound the Roots; it is manual Labour, and therefore comes more expenſive; and it does not ſo perfectly clear the Ground.

CHAP. LXXXIII.

Of Saff-flower, or Carthamus.

WE here treat of a Plant leſs known than any other which comes under the Cognizance of the Farmer, nor is there any great Matter to be ſaid in its Recommendation: however, as it is cultivated in ſome few Parts of England, and very much in other Parts of Europe; and as there may be Circumſtances that may render it advantageous to the Farmer to ſow it, we ſhall not omit to give him ſuch an Account of its Nature and Management, as may make him properly acquainted with it for his Purpoſes.

Saff Flower, or Carthamus, is cultivated for the Sake of the Flower, as the Saffron is; and probably the Culture of Saffron gave riſe to this Article, for its Flower is uſed to ſome of the ſame Purpoſes, and is called for that Reaſon baſtard Saffron.

The Plant however is utterly unlike Saffron; it is a kind of Thiſtle, and wherever it grows, whether wild or cultivated, it has very much the Appearance of a Weed.

It is an annual Plant. The Stalk is ſturdy, robuſt, and four Foot high. The Leaves are large and broad, not divided or indented, but beſet with Prickles at the Edges: the Flowers grow at the Tops of the Branches, into which the main Stalk divides towards its upper Part; and are a kind of large ſcaly Heads, ſomewhat reſembling thoſe of our Thiſtles, with a great Quantity of Threads iſſuing out at their Tops. Theſe Threads are of a moſt bright and beautiful yellow, and have been ſuppoſed by ſome to reſemble the Blades in the Flower of Saffron; but there is not much Likeneſs: it is for the Sake of theſe the Plant is cultivated principally, tho' the Seeds are alſo an Article in Trade. The Root is white and long, and it periſhes as ſoon as the Seeds are ripened. Its firſt Shoot when ſown, is in certain large broad Leaves, but theſe periſh when the Stalk riſes.

The Flower of the Carthamus examined more accurately, is found to be contained in a large common Cup: this ſerves for the ſeveral Flowers of which the whole Tuft is compoſed, and forms what we call the Head of the Carthamus: it is of an oval Form, and is compoſed of a great Number of Scales placed like Tiles one over another, and they have each the Addition of a kind of little Leaf of an oval Form. The whole

whole Tuft is compoſed of ſeveral tubelar Flowers, each is formed of a ſingle Leaf, and has the hollow narroweſt at the Baſe, and wider all the Way to the Mouth, where it is divided into five, little, and nearly equal Segments.

In this Flower riſe five ſhort Filaments, and at the Tops of them ſtand ſo many Buttons, which are of a cylindrick Form and oblong.

In the Baſe of the Flower is depoſited the Rudiment of the Fruit: this is very ſmall and ſhort: from its Top there riſes a kind of Filament longer than the others. This is the Part to which the three Blades grow in the Flower of the right Saffron; but in this it is terminated only by a plain little Head, which ſerves to receive the Duſt from the Heads of the ſhort Filaments to impregnate the Seed.

When the whole tender Part of the Flower is faded, the ſcaly Head remains, and contains the Seeds. One follows every Flower.

Several other Species have been added to this, and called by the ſame Name, one with blue Flowers, and others with divided Leaves; but the true and proper Plant to be raiſed for Uſe, is that here deſcribed.

It is a Native of Ægypt, and ſeveral Parts of the Eaſt; and is cultivated in many of the warmer Parts of Europe: it thrives alſo very well in England.

The principal Place where we have ſeen it in England, is in ſome Parts of Norfolk; but, if worth while, it might be raiſed in any other Part of the Kingdom.

Thoſe who ſhall think it worth while to raiſe it, muſt obſerve the following Directions. In the firſt Place, let the Farmer take Care to have the Seeds from Abroad; and as often as he ſows it let him get freſh ones, for they do not ripen well in England. Theſe may be had at a very ſmall Expence, and with little Trouble. The Druggiſts ſell them, but theirs are not to be uſed, for they are commonly old. But ſuch a Quantity of it is raiſed every Year in Germany, that good Seed may always be had.

When the Seed is procured, the ſecond Care is the Ground. The beſt Soil is a dry Loam, and it does not require a rich Piece of Land of this Kind; ſo that the Charge of this Article is not great, nor indeed in any other.

The Seeds are to be ſown by Hand in a ſparing Manner, on the Land in Spring, and to be harrowed in. When they have ſhot, and the Plants have ſome Strength, they are to be thinned. Hoers ſhould be ſent into the Field for this Purpoſe, and they ſhould have Orders not only to cut up what Weeds have riſen, but to thin the Plants themſelves; leaving them at about a Foot Diſtance, and ſaving ſuch as appear the ſtrongeſt and moſt thriving. From this Time no farther Care need be taken of them: they will grow quick, and being ſtrong Plants, and thus near to one another, no Weeds will be able to get Nouriſhment among them. Early in Autumn they will begin to flower; and then the Field will make a beautiful Appearance; there is nothing can exceed the Brightneſs and golden Hue of the Flowers, nor have we any Thing of our own Growth that comes near them. The Plants branch out toward the Top, and the upper Part of every Branch is loaded with Flowers, ſo that the whole Field is covered, and as it were gilded with them.

The gathering of theſe Flowers ſo far reſembles that of Saffron, that they are to be taken as they open; for if left for ſeveral Days together, they will loſe their Colour, and that is in a Manner their whole Value.

For this Reaſon as ſoon as there is any Number of them open, the Pickers, who are in this Article the Gatherers alſo, are to be ſent into the Field. The Flowers are not gathered there and picked afterwards, but the whole Buſineſs is done at once. The whole tender Part of the Flower is to be taken, leaving the ſcaly Bud. When thoſe which are open are thus carefully picked off, they are to be ſpread upon a large Floor in an airy Place, out of the Sun to dry; and this is all that is to be done to them.

When they are dried in this Manner, they look of as beautiful a Colour as while growing, and they are ready for Sale without farther Care or Trouble.

Every Day or two the Pickers are to be then ſent into the Field as at firſt, to gather the Flowers as they ſhew themſelves, and this is to be the Method till the whole Quantity are blown; one Parcel being put to dry after another. The whole Parcel being thus prepared by a ſimple and natural drying, is ready for the Purchaſer.

If the Seaſon have been favourable, and the Crop have flowered early, ſome Seeds may ripen; but as this is ſuch a great Uncertainty, there is no Dependance upon it; and the better Method is to grub up the Plants as ſoon as the Flowers are gathered, that the Land may be prepared for ſome other Crop.

The Dyers are the People who purchaſe the Flowers; ſome have idly ſuppoſed they were of the ſame Nature with Saffron, becauſe they reſembled that Drug in ſome Degree in Appearance; but it is ſo far otherwiſe, that as Saffron is a Cordial and Sweat, theſe Flowers are a Purge, and the Seeds a Vomit.

We have mentioned the only right and honeſt Uſe of the Flowers of this Plant; but there have been ſome, when it was more cultivated than it is at preſent in Enoland, who had a Way of mixing it with Saffron when they worked it in the drying.

How improper this was we may know from the Difference of the Virtues of one and the other; but there was another Reaſon why the Farmer never ſhould have done this, which is, that it reduces the Price.

The thready Part of the Carthamus is narrow, harſh, dry, and paler coloured than the Blades of Saffron; therefore no Art can ſo blend them together, as to make them capable of impoſing upon any but the ignorant: 'twas the inferior Sort of Saffron made up from the laſt Gatherings that they mixed up in this Manner, and it reduced the Price of this ſtill lower.

One Reaſon why the foreign Saffron is held in ſo much Contempt in England is, that there is too often Carthamus among it,

CHAP.

CHAP. LXXXIV.

Of Madder.

MADDER is cultivated principally for the Dyers, as well as the Carthamus; though there is in this Article alſo, a Conſumption though comparatively ſmall, among the Druggiſts: but there is a great deal of Difference in the Demand; and as lightly as we have ſpoke of the other, we ſhall very ſtrongly recommend this to the Farmer, becauſe the Sale and the Profit are equally certain. 'Tis a vaſt Quantity of Madder that is annually brought into ENGLAND; and we have the more Reaſon to be out of Humour with this Importation, becauſe it is brought from Places that have no Advantage over our own Fields; and frequent Experience ſhews, that the Plant will grow and thrive as freely and as well with us, as in many of thoſe Places whence we have it, at a very conſiderable Price.

The Government at one Time interfered in favour of the raiſing this uſeful Product in ENGLAND, but it has been ſince almoſt utterly neglected.

Madder is a Plant of very little Beauty, and is more like a Weed than the Carthamus laſt deſcribed: it in ſome Degree reſembles the common Cleavers, or Gooſe Graſs, in its Manner of Growth, but that is larger and duſkyer coloured. 'Tis a rude irregular growing Plant. The Stalks are numerous, ſquare, and commonly of a reddiſh Colour: they are weak, ſo that they lie upon the Ground in their lower Part; and in the upper, commonly intangle one with another. The Leaves are long and narrow, they ſtand ſix at a Joint; ſometimes more, ſometimes fewer, and are diſpoſed like the Rays of a Star. Their natural Colour is a duſky green, but they ſometimes, eſpecially toward the lower Part of the Stalk, grow reddiſh. The Stalk is hairy, but theſe are more ſo: their Hairyneſs is not a woolly Down like that of ſome Plants, but is ſhort, rough, and hard, ſo that they prick the Hands when touched.

The Flowers grow at the Tops of the Stalks, and ſmall Branches; they are little, but very numerous, and of a pale yellow. The Seeds follow, which are contained in a kind of round little Heads; the Root, which is the uſeful Part, is extreamly long, and of a beautiful red Colour: duſkyer on the Surface, but very bright within.

The Cup in which the Flower of Madder ſtands is very ſmall, and ſtands upon the Rudiment of that little roundiſh Fruit in which the Seed is to be lodged: it is compoſed of a ſingle green Leaf, hollowed and divided into four little Segments at the Edge.

The Flower is in the ſame Manner formed of a ſingle Leaf, and is a little hollowed at the Bottom, and divided lightly into four Parts at the Edge. In the Centre of this riſe four ſhort Filaments, each terminated by a ſingle Button or Head: from the Rudiment of the Fruit, which, as it enlarges a little, ſhews itſelf to be compoſed of two Parts, there riſes a ſingle Filament called the Style of the Flower; this comes up in the Midſt of the four Filaments juſt named, and is divided into two Parts toward the Top, each of which has a Button to it: this through certain imperceptible Apertures, admits the Duſt from the Heads of the other Filaments for the ripening of the Seed Veſſel, which then ſwells, and becomes a kind of double Berry: in each Part of which, or each Berry, is contained a ſingle Seed.

There are two Kinds of Madder mentioned by thoſe who treat of Plants, theſe are the ſix leaved Kind we have deſcribed, and one which has only four Leaves at a Joint, but the latter is not worth the Farmer's Notice.

In Places where the right Kind is commonly cultivated, there grow up a Number of Plants in waſte Places from the ſcattered Pieces of Roots, and perhaps from the Seeds of thoſe in the manured Fields: theſe wild Plants being ſmaller and poorer than ſuch as have the Advantage of Culture, are diſtinguiſhed as a ſeparate Kind under the Name of Field, or wild Madder; but they are the ſame Plant under another Form by Accident. Therefore there is properly but one Kind of Madder, in the Conſideration of thoſe who would raiſe it for Uſe. 'Tis a Native of the Eaſt, and of ſome Parts of EUROPE: but its Roots in the wild State never arrive at any Thing near the Perfection of the cultivated, and that for this plain Reaſon; that in the latter Condition they run in a free, light, wrought Ground where nothing ſtops their Progreſs; and though they never attain any conſiderable Thickneſs, they run to a vaſt Length.

CHAP. LXXXV.

Of the proper Soil for Madder.

MADDER being one of thoſe Plants that roots deep, and the Value of which is in the Root; the Soil for it ſhould be deep and light. This is the principal Caution; for it will get Nouriſhment whether the Ground be richer or poorer, provided it be not altogether barren. A black Mould, ſuch as is common in the Fens of ENGLAND, is very proper; and is the ſame Soil whereon they plant it in FLANDERS, whence we have our greater Supply. A loamy Soil that is in ſome Degree rich, and has but little Clay in its Compoſition, is alſo very proper; or a Mixture of Loam and Mould, as is very common in many Parts about the Edges of the Fen Countries.

There is no Part of ENGLAND where this Plant would thrive better than in theſe Places; for they have all the Advantage of the FLEMISH Grounds; and this farther Benefit, that they are drier. The FLEMISH often burſting their Roots by their over Moiſture, or occaſioning an expenſive Manner of Dreſſing to prevent that Accident.

Whatever be the Soil for Madder it muſt be deep. We have obſerved it is the Nature of the Root to extend itſelf in Length, and that no Art can bring it to any great Thickneſs;

therefore a Depth of Soil is the moſt eſſential Point, that it may have Room to penetrate. There are uſually produced a great many Side Roots, which ſpread along juſt under the Surface of the Ground. Theſe are the Proviſion of Nature, for the Nouriſhment of the Stalk and Leaves, the great Root taking almoſt all the Juices it receives to its own Nouriſhment. Now as the Stalks and Leaves of this Plant are of no Uſe or Value, it is idle to provide for the maintaining them in Vigour at the Expence of the main Root. Theſe horizontal Shoots never come to any Value themſelves, and as they only take that Nouriſhment which ſhould ſupply the main Root, the proper Courſe is to deſtroy them.

This Account of the Nature of Madder, and of the Soil that ſuits it, naturally points out a new Method of managing it to Advantage. Of all Plants that can be raiſed, none is ſo perfectly ſuited to the Horſehoeing Huſbandry. The Soil it requires is ſuch as perfectly ſuits thoſe Implements; the Method of Horſehoeing, of all other Practice, will the moſt effectually and moſt eſſentially cut off the ſhallow and horizontal Roots; and as the main Roots are to be encouraged in their Growth to the utmoſt, no Method of planting can be ſo proper as that in Rows at a conſiderable Diſtance from one another. This directs in every Article the Horſehoeing Huſbandry, as the Method for raiſing Madder to an Excellence, and perhaps ſuch a one as it never reached any where yet in England. The Culture of this profitable and uſeful Species, has been recommended frequently and ſtrongly, and has been tried at different Times with different Succeſs, but always with ſome Profit; we hope therefore that the Farmer will be encouraged, from what has been found of the Advantages of this Crop, in Methods leſs ſuited to its Nature, to try it in the Way we are about to propoſe; in the which it cannot fail of very well anſwering his Care, Expence, and Trouble; and according to which there is a reaſonable Proſpect of his enriching himſelf by it in a few Years Culture.

CHAP. LXXXVI.

Of the Management of the Ground for Madder.

MADDER is to be planted in Spring, but the Preparation of the Ground for it muſt be undertaken long before. Let the Farmer who intends to raiſe it, look carefully out for a Field that has a deep light Soil, of the Nature of either of thoſe Kinds we have mentioned. When he has fixed upon the Field, in Autumn, as ſoon as the Crop is off the Ground, let him plow it up deeply and thoroughly with the four coultered Plow. Let him leave it in this Condition three Months, and then go over it with the ſame Plow once again: this will tear it up to a great Depth, and thoroughly break and divide it: let him then leave it to itſelf till the End of March: at this Time let him look out for ſome Sets in ſome of the Garden Grounds about London, where a Quantity of Madder is raiſed for the Supply of Covent Garden Market, and to dry for the Druggiſts, though not for Dyers. Having ſpoken about his Sets, let him, in the laſt Week in March, ſend in his four coultered Plow again, ſet to go to the greateſt Depth it can. As the Ground has been twice plowed before, it will very well give Way to this, and the third plowing being well and carefully managed, the whole Field will be turned up more than two Spit deep, and nearly as well wrought as by Hand with Spades, though at a vaſtly ſmaller Expence. The Sets are now to be taken off from the Sides and Heads of the old Roots, and the Ground is to be harrowed to lay it even. Then a Line is to be drawn along near the Edge, as in the planting of Liquorice; and the Sets are to be let into the Ground in the ſame Manner, at a Foot Diſtance from one another.

When one Row is thus planted, the Line is to be removed a Foot and half, and another Row planted, the Sets in this not being placed oppoſite to thoſe in the other, but juſt over againſt the Middle of the Space between.

The Line is then to be removed to the Diſtance of five Foot, and drawn ſtrait over the Ground as before, and a Row of the Sets are to be planted there; thus there will be a third Row at five Foot diſtance from the ſecond, and at ſix and a half from the firſt Row: the Line is then to be moved again one Foot and half, and another, being a fourth Row, is to be planted oppoſite the middle Diſtances of the laſt. Thus the whole Ground is to be planted out. The Sets are to ſtand every where at the ſame Diſtance in the Row, as at firſt ordered; and the whole Field will be laid out in double Rows, with five Foot Intervals; the Space or Partition between one Row and another, of each double Row, being one Foot and a half.

When the Sets are all in and lightly covered up, let the Planter go over the Places where they ſtand, with a Garden Rake, and lay all level.

The Beginning of April is a Seaſon when Showers are ſeldom wanting, but if it ſhould ſo happen that there are none, there muſt be the Labour of once watering the Sets. The beſt Time for doing it is on the third Day after their planting, and when this is done they may be left to Nature.

CHAP. LXXXVII.

Of managing the Crop the firſt Seaſon.

THE Plants will now quickly appear, and as this is a Time when the encreaſing Warmth of the Seaſon, and wet from the Showers, ſets every thing on growing, Weeds will appear among them. As theſe muſt be principally Seedlings, for we ſuppoſe no Roots left in the Tillage, they will not at once over-run the proper Growth, becauſe that is planted with good Roots; ſo that they need not be attacked ſo ſoon as ever they appear; but when they have got a little Height the Hand Hoers muſt be

ſent in to clear the Partitions of them between Row and Row, not meddling with thoſe in the five Foot Intervals, except juſt on the Outſide of each Row.

This is to be done with Care and Management, and a great deal depends upon it. The Inſtructions to be given the Hoers are theſe. Firſt to take Care of the Plants of Madder, which being ſet regularly, and now up at ſome Height, and being very different in their Aſpect from the Weeds, cannot well be miſtaken; all this however muſt be pointed out to them, and they muſt be ſtrictly cautioned, for the Deſtruction but of a few of the Plants where they are ſet ſeparate, and each intended for a large Growth, will be a conſiderable Loſs to the Owner. This being pointed out to them, they are to be ſent in with Directions to cut up all Weeds in the ſmall Partitions, and break the Surface of the Ground as deep as they readily can with thoſe Inſtruments; then they are to clear away between Plant and Plant of the Madder; and thence advancing to the Outſide they are to cut up the Weeds, and break the Ground for about a Hoe's Breadth all along the Rows.

This done the Plants are to be left to themſelves three Weeks, in which Time they will ſtrike very ſtrongly, and the Ground juſt about them will be very clear of Weeds, from the hoeing; but by this Time the Middle of the large Intervals will be full of Weeds of ſome Growth.

The Horſehoe is now to be ſent in, and is to cut along the Middle of each Interval, to as much Depth as it can: this will thoroughly root up and deſtroy that Growth of Weeds, and break the Ground. The Weeds will, in great Part, be buried, and will become a Kind of Manure, for Weeds that cannot grow, ſoon rot at this Seaſon, which is warm and wet; and the Ends of ſome of the longeſt Fibres of the Madder Roots will be broken off, and new ones will conſequently grow in great Quantities from them, as is ſeen in cutting of the Fibres of Roots in the Gardener's Way of planting; and there will be a fine Quantity of freſh and free Earth for theſe new Roots, as alſo for what farther Shoots the others may make; and it will be full of Nouriſhment for them.

The Syſtem of Management in this Article of Madder, varies according to the Circumſtances of Times, and it is fit we explain it to the Planter, that underſtanding the Reaſon of our Directions, he may obſerve them the more punctually.

We have told him that the main downright Roots are all that are of Value in his Madder Plants. Now the horizontal or ſpreading ones, that run under the Surface, are to be conſidered in two diſtinct Lights, as they are larger or as they are ſmaller, for at one of theſe Times they impoveriſh, but at the other they feed them; ſo that at one Time they are to be nouriſhed, and at another deſtroyed.

It is while they are young that they are of Advantage to the main Root. This is their Condition in the preſent Inſtance, and it is therefore we are recommending every Method to feed and to encreaſe them; and on the other Hand, we ſhall ſoon after take as much Pains to deſtroy them. The Part of the Madder above Ground, now though of ſome Bigneſs, is not ſo large as to demand any vaſt Quantity of Nouriſhment; the Root, on the contrary, is puſhing downward, and grows the faſter the more it is ſupplied by its Fibres, and the leſs it is drained by the Plant above.

This is the Caſe in many Inſtances at the Period of Growth whereat the Madder is at preſent, but in none more viſibly. The firſt Nouriſhment the new planted Roots take in, goes to the puſhing ſome Fibres from themſelves outward, and a Shoot of Stalk and Leaves upward. This Shoot takes up the greater Part of the Nouriſhment in the firſt Days, but afterwards it grows ſlower, and requires a ſmaller Proportion of what is drawn. After this there is a Period when the main Root is taken Care of and ſupplied, that it may be able to ſend up Nouriſhment in Abundance to the Herb, when ripening its Flowers and Seeds, that being the great Purpoſe of Nature in all Plants: for this Purpoſe alſo in Madder a Number of long horizontal Roots grow out every Way under the Surface.

Theſe horizontal Fibres we have named, and for which we are now ſo carefully providing by the Horſe Hoe, are in Time to become thoſe long horizontal or Side Roots. At preſent they are very ſerviceable, for they draw in Nouriſhment in vaſt Abundance; which being not demanded in that Quantity by the Plant in its preſent State, goes according to the Deſign of Nature, to the feeding and enlarging the main or downright Roots. The preſent Horſehoeing has vaſtly encouraged, filled, and encreaſed them; but the next is to deſtroy them.

Some Time after this Horſehoeing there will be Weeds again in the Partitions, and between Plant and Plant, for this is a Seaſon that produces them very quickly: the Hand Hoers muſt be ſent in again to cut them all up, and the Plants of the Madder being kept clear, will have a healthy Aſpect, which is very eſſential to the good Growth of the Root, and which they would not have if choaked up with Weeds: ſome Weeks after this, when the Madder has grown to a conſiderable Size, let the Horſe Hoe be ſent in a ſecond Time, with Orders to cut much nearer one Side, or one Row, alternately; by this Means all the large horizontal Roots on that Side will be cut and broken off, and only ſmall ones will grow from the Ends of them, which will tend to the Service of the main Root again.

The Hand Hoers at this laſt Time need not hoe the Outſides of all the Rows, but only alternately of thoſe near which the Horſe Hoe is not this Time to come, for the next hoeing it is to take the others. This Inſtrument could not be brought ſo near the Rows while they were young, for fear of tearing up or burying the Plants, but they are too well eſtabliſhed now to be in any Danger on that Head, eſpecially as it is done only on one Side; for the Horſe Hoe is to be carried along the fartheſt Side of the next Interval all the Way, in the Courſe of this Operation; ſo that it never comes near both Sides of the ſame Row.

The

The Plants will immediately after this thrive ſurpriſingly, and advance toward their flowering. There will need no more Handhoeing, for they will be now of ſuch a Size and Strength, as to deſtroy all the Weeds about them; and the next Horſehoeing, which will be the laſt for the Summer, will compleat the Work for the firſt Seaſon.

This is to be done as ſoon as the Weeds have got ſome Head again in the Intervals, for they will riſe there though they be over-powered in the Partitions. The Inſtrument is now to be carried on the other Sides of the Rows alternately, ſo that now there will have been a thorough and deep cutting up of the Ground, near both Sides of every Row.

The large horizontal Roots, which would impoveriſh the main Roots, and be of no Value in themſelves, are now broke and cut off on this Side alſo; and the main Roots, which are now large and ſtrong, have all the Advantage of the Nouriſhment.

The Flower and Seed of Madder are wholly uſeleſs: and we have ſeen, on all Occaſions, how greatly a Plant's running to Seed impoveriſhes the Root. This dictates a new Practice in the preſent Caſe, which is the cutting down the Plants juſt before they are breaking out into Flower.

Let this be done with Caution, and with Moderation. The Farmer is not to cut them down cloſe to the Ground; it is enough if he ſtop their running to Seed, therefore all he has do is to cut them off half a Foot below the Top. This will take off all the Flower Buds, and yet will leave enough of the Plant to draw up a great Quantity of Sap, and keep Nature in her proper Courſe. By this Means a vaſt Quantity of rich Juice, intended for the Perfection of the Plant in its Ripeneſs, will go to the main Root, for there will be no large Side Roots to take it up; and the Encreaſe in that uſeful Part will be very ſurpriſing.

The Stalks will ſhoot out Side Branches from the Part where they were cut off, and from every Joint below, and will grow ſtronger for that cutting, and very buſhy. Some of theſe will make an Attempt to flowering, and they may be left to themſelves in it. The few Flowers that grow upon theſe Shoots are not like the full and univerſal flowering of the whole Growth, they will do neither Good nor Harm, and are not worth regarding.

The firſt Summer will thus paſs, and the Plants not having drawn a vaſt deal of Nouriſhment upwards, the Roots will be greatly ſtrengthened and encreaſed. This will be the Condition of the Crop at the Autumn of the firſt Seaſon; and all that is to be done is in the ſame Manner to promote the Growth of the Root, during the reſt of the Time it is to remain in the Ground, which is to the next Autumn. A Crop of Madder, though it remain but eighteen Months in the Ground, is to be accounted by the Farmer as a two Years Standard, becauſe the Preparation of the Land takes up the other ſix. The whole Courſe is this, at Autumn the Ground is to be taken for it; during the Winter it is to be prepared, and in Spring it is to be planted: the next Autumn the Plants have had one Summers Growth, and they are to have another, for they muſt remain through the Winter, and the following Summer: and the Roots muſt be gathered in Autumn following, which is two Years from the Time of beginning the Preparation of the Ground.

In the uſual Way of Management, when the Roots are taken up at this Time for Sale, another Piece of Land is to be ſought out for the next Crop; but in the Method we have propoſed by the Horſehoeing Huſbandry, the ſame Piece of Ground may raiſe Madder for ever; and will be fitter for it than any other could.

CHAP. LXXXVIII.

Of managing a Crop of Madder the ſecond Seaſon.

WE have brought the Huſbandman through the firſt Summer with his Madder, and have put him into a Way of making it much finer than it can be by the common Methods in that Time; at Autumn the Stalks die away, and the Weeds die with them: and from this Time, according to the Manner of ſpeaking in the Madder Countries, they date what they call the ſecond Seaſon.

All the Winter the Ground is to lie perfectly quiet: in Spring, a Fortnight before the Plants begin to ſhoot, the Horſe Hoe ſhould be ſent in to cut a deep Furrow in the Center of every large Interval, and the Hand Hoers to cut up thoſe Weeds that riſe in the Partitions. After this there will be no more Care needful about them, for the Growth will be too ſtrong to ſuffer any Annoyance; but the Intervals will have Weeds, and ſhould be Horſehoed juſt as in the preceding Summer, to prevent their farther Growth, and to give new Supplies of Nouriſhment to the main Roots, as well as to cut away and deſtroy the Side or horizontal ones.

This is to be done exactly in the ſame Manner as before-mentioned for the firſt Seaſon, and therefore needs not be deſcribed more at large here. By this Means the Crop will proceed as it ought in every Reſpect; and this Seaſon the whole Care will be over.

In Autumn, when the Plants wither, is the Time to take up the Roots, this muſt be done with Care and Circumſpection, for the more they are broke in the Ground, the more of them is loſt. The regular Method of planting them comes in here to be of great Uſe, for the People employed to take them up know where to look for them one by one, and where they may, and where they may not, work about them.

When they are all taken up they muſt be cleaned from Dirt, and after a Quantity of fine Sets are ſeparated for a new Plantation, they are to be dried for Sale. The Dyer will be always a ready Purchaſer, nor needs the Huſbandman fear to overſtock the Market. The Uſe of the Root is to die Reds and Purples, and as an Ingredient in many other Colours: and the Quantity imported annually from Flanders, Germany, and Holland, amounts to fifteen, twenty, or twenty-five Thouſand Pounds.

CHAP. LXXXIX.

Of planting a ſecond Crop of Madder.

IF the Huſbandman be ſatisfied, as he very well may with the Produce of his firſt Crop of this Root, he may reaſonably promiſe himſelf much larger Advantages from the ſecond, becauſe he will have, 1. More Experience and Knowledge in all the Particulars relating to its Management. 2. A better Supply of Sets; and, 3. A fourth Part more Time for their Growth, which will be no ſmall Addition to their Bulk.

In the ſetting out with the Undertaking, ſix Months were neceſſary for preparing the Ground; but the Land is now all ready: the five Foot Intervals have been, during the eighteen Months Growth of the preceding Crop, in a State of Fallow; and they are now ready to receive the new Plantation, ſo all that Time is ſpared.

We ſhall enter regularly upon the Progreſs of the Buſineſs: in the Beginning of October the Ground is clear, and the Sets are taken from the old Roots. Let this Opportunity be ſeized, and while theſe Sets are preparing for the Ground, let the Ground be alſo preparing for them.

The Method of planting them is to be exactly the ſame as at firſt, in double Rows, with a Foot and half Partition between the two, and with a five Foot Interval between Pair and Pair of them.

The Rows are now to be planted in the Middle of the former Intervals, and therefore the Places where they ſtood before, will become the Middles of ſo many new Intervals; and enjoying a Fallow of two Years, with frequent Tillage during the whole Time, while the new Plantation is growing, they will after that be in a Condition to feed a new Crop, and ſo on from Year to Year; the ſame Field by this Management being enabled to bear the ſame Produce for ever.

While the Pickers are ſelecting the fineſt and ſtrongeſt Sets under the Eye of the Owner, let the four coultered Plow be again turned into the Ground. It is now to tear up the Middle of each Interval, and is to be followed by the Harrow. By that Time the Ground is thus fit, the Sets will be ready, and the ſooner they are let into it the better. Theſe will be ſuch in Strength and Goodneſs, as it would be impoſſible for him to obtain by Purchaſe, and they will ſtrike immediately on being planted.

The Lines are to be drawn in the ſame Manner as for the firſt Plantation, and the Sets let in with the ſame Care. They will have Time to ſtrengthen themſelves for the following Winter, and will be ſo rooted and fixed in the Ground by the ſucceeding Spring, that they will ſhoot in a Manner not to be expected from a Spring Plantation.

As breaking and dividing the Soil to a certain Depth, is all that is required for the well nouriſhing of this Crop, the Ground will be now much better than at firſt, becauſe it has been continually turned and new broke during the Growth of the other; and as the Weeds which had lived upon it were always deſtroyed in their firſt Growth, and had rooted therefore but ſlightly, the whole Soil is full of Nouriſhment.

It may be queſtioned indeed, whether a Courſe of Tillage in this Way, ſuffers any Thing by thoſe ſhort Growths of Weeds or not; for as they exhauſt little they return ſomething, probably as much on being rotted in the Earth, and become a kind of natural Manure.

The Madder thus planted, is to be managed exactly as the firſt Crop: it is to be taken up juſt two Years after the Planting, and it will be found vaſtly preferable to the preceding. Some who have raiſed Madder, propoſe keeping it three Years in the Ground; but they certainly had not fairly and exactly tried the Difference. The Roots will gain ſomething the third Year, but not comparable to the Diſadvantage of the Loſs of a whole Year's Time; neither are they always ſo good as they ſhould be.

The ſecond Autumn is the Seaſon when this Root has arrived at its Perfection; and is the moſt profitable Time, on all Accounts, for takeing it up.

CHAP. XC.

Of the preparing Madder Root for Sale.

THERE are different Ways of managing it when taken up; and different Forms under which it is brought to Market. But we adviſe the Farmer to think of nothing more than plainly drying it, and ſelling it entire, at leaſt at firſt. It may be very well dried in a Hop Kiln, with a little Fire; and will always ſell in that State.

The other Methods of managing it are by ſtripping off the outer Rind, then the ſecond Bark, and ſo ſelling it in the three Forms, of the Rind, the Fleſh, and the Fibre: and it may be alſo in either of theſe States ground, and ſold in the Condition of Powder. For all theſe Purpoſes Labourers may eaſily be had from the Countries where the raiſing of Madder is common, and they will ſoon let the Owner into the manual Operation.

We are not againſt his undertaking all this, for we are aware of the Advantages, and would have him make the moſt every honeſt Way of his Crop: but this is not eſſential to the Traffick in Madder, and therefore we would not have him perplex himſelf by ſetting out with it.

Let him firſt raiſe his Madder as we have ſhewn, and ſell it plainly dried; and after that, let him get proper People to ſuperintend and manage the ſeveral Operations in the preparing the Root for more advantageous Sale; always having an Eye over the Work himſelf, and making it his chief Care to get himſelf as quickly as he can into the Secret of the ſeveral Practices: for if he omits this, he will lie at the Mercy of his Servants, which is a very miſerable as well as hazardous Situation.

For his general Information we ſhall here add, the Terms by which Madder is called in its ſeveral States, according to theſe Ways of Preparation, and the Method at large in which they are manufactured. There is more in it than can well be conveyed in Words, for theſe manual Operations are to be learned like Trades, by Practice, not from Deſcription; but enough may be ſaid to explain the ſeveral Kinds and Forms in a ſummary Way.

When the Root is managed in that plain and eaſy Way which we have adviſed our Farmer firſt to practiſe; that is, when it is only taken out of the Ground cleaned from the Earth that hangs about it, and dried, and in that State offered to ſale, it is called Madder in the Branch.

A great deal is brought from Flanders in this Condition, and our People are very willing to purchaſe it: but as this is the leaſt profitable Management of it, this Branch Madder is brought principally from thoſe Places where the Trade is leaſt underſtood, or where they want Hands or Engines for the managing it according to the other Ways.

The firſt Management after this affords three Species. In order to the preparing theſe, the Root muſt firſt be dried to a certain Degree, with which thoſe who are accuſtomed to the Work are perfectly acquainted: then its ſeveral Parts ſeparating eaſily, they ſtrip off firſt the outer Skin or Rind, and next the fleſhy Part, leaving the Pith or central Matter bare and entire. Theſe they lay in three Heaps, and diſtinguiſh by three diſtinct Names.

The firſt, which is only the outer Rind, is coarſer and fouler than the reſt, this they call Mull Madder; the ſecond is firm and beautiful: from its running into Quills when it comes off entire, which have a round opening at the Ends, they call this Letter O Madder, and ſometimes Number O Madder, or plainly O Madder; the third Parcel, which is the entire Pith of the Root, and is of a paler Colour than the reſt, they call Crop Madder.

Here are four Kinds of Madder for Sale, and theſe are in Reality all the Differences in that Commodity, except the Article of reducing it to Powder; but as different Kinds according to theſe Diſtinctions may be, and are reduced to this Condition, they are called by various Names.

The ground Madder is principally, however, of two Kinds; it is either the whole Root dried, which they call Branch Madder ground to Powder; or it is the middle Part, called Number O Madder.

When the firſt Kind, or the entire Root is ground, it is uſually ſold under the Name of Bunch Madder; and when the Number O Madder is ground, its Name is Looſe Madder. Theſe are the ſeveral Terms which the Cultivator of Madder will now eaſily underſtand. It is not eſſential to him to follow theſe ſeveral Practices, but he will find it profitable. In the mean Time he may always find a ready Market for the entire Root dried, which is what the Purchaſer knows under the Name of Madder in the Branch; and without concerning himſelf farther, may thus make ſuch a Profit as will ſurprize the unacquainted with theſe Things to hear it named.

Whether all that has been ſaid of the vaſt Profits of this Species be true, we ſhall not take upon us to determine, but there is not the leaſt Doubt of its equalling any Crop that can be raiſed.

CHAP. XCI.

Of Teaſil.

THIS is an Herb raiſed for a particular Uſe in the Woollen Manufacture, which no other known Subſtance can ſo well ſupply: for this Reaſon while the Woollen Manufacture continues ſo important as it is to England, it will be always worth the Farmers while to be acquainted with this uſeful Plant; and occaſionally, according to the Nature of his Situation, and the Demand, to cultivate it.

Teaſil is not one of thoſe univerſal Commodities for which there is every where a Market. It may be raiſed in any Place; and it is of cumberſome Carriage: therefore he muſt be very imprudent, who ſets about to cultivate it at a Diſtance from the Parts of the Kingdom where it is uſed, becauſe nothing need prevent thoſe from doing it who are upon the Spot; but to ſuch as are, it proves on many Occaſions a very profitable Growth.

The great Advantage attending it is, that it does not require the beſt of the Farmer's Ground; and that it demands very little Trouble; for after it is once up, it is too ſtrong for Weeds to grow amongſt it.

For theſe plain Reaſons, the Farmer will find that it may be often his Intereſt to raiſe it in the Cloathing Countries; and we ſhall proceed to acquaint him with the moſt profitable Manner wherein that is to be done, after we have informed him of the Aſpect and Nature of the Plant.

Teaſil is one of thoſe Plants which ſhew us moſt obviouſly the Effects of Culture. We ſee in many Inſtances Things raiſed to a Perfection in Gardens, which they never attain in their wild State, but we have ſeldom the Opportunities of comparing one with the other. In the Teaſil they are always before us. What we call wild Teaſil in the Hedges, is the very ſame with that the Farmer is to cultivate for the Uſe of the Clothier, excepting the Difference from Culture, and they may always be viewed together to ſee what that Advantage is. The Heads of the cultivated Teaſil are raiſed to a Perfection thoſe of the wild Kind never reach, and on that Change depends entirely their Uſe in the Manufacture.

The common Teaſil is well known by its tall Stalk, and great rough Heads; we ſhall therefore confine our Deſcription to that Plant as improved by Culture.

The manured Teaſil grow to the Height of ten Foot, and is a robuſt, ſtately, and very regularly growing Plant. The Root is long, thick,

thick, and white. The Stalk is very ſtiff, firm, and of a pale Colour, and is armed with Prickles. The Leaves that riſe from the Root are very large, long, and of a bright Green, and are full of ſharp pointed ſtrong Prickles. Thoſe on the Stalk are of the ſame Shape: they grow in Pairs, and joining one another at the Bottom, they ſurround it, forming a kind of Baſon round about it, which holds at all Times a great deal of Water catched from the Dews and Rains. Theſe Leaves, like the lower ones, are full of ſharp Prickles. Toward the Top of the Stalk there riſe ſeveral Branches, and theſe divide again into others toward their Extremities; and at the Top of every ſuch Diviſion there grows a large rough Head, fully as big as a Man's Fiſt, and of a ſomewhat oblong Form. This reſembles the Head of the common wild Teaſil, but is much bigger; and as it is covered in both Kinds with a Kind of ſmall tough Prickles, theſe which ſtand nearly ſtrait in the wild Kind, all bend downward in Form of Hooks, in the manured Teaſil; and by that Circumſtance it is that the Head is ſo fit for the Service of the Clothier: it becomes a Kind of Inſtrument for the dreſſing of Cloth, which for the Number, Diſpoſition, Toughneſs, and Springyneſs of its Hooks, exceeds any Thing that can be made by human Art.

Theſe Heads contain the Flowers, and Seeds of the Plant. The whole Head is a Kind of common Receptacle, holding a great Number of Flowers which appear in Succeſſion for many Days: each of theſe Flowers has its particular Cup, but that is very ſmall, and ſtands upon the Rudiment of the Fruit.

The Flower is ſmall and hollow, it is a Kind of Tube, conſiſting of a ſingle Leaf, divided into four Segments at the Edge, the upper one a little larger than the others. In the Centre of this riſe four Filaments: they are very ſlender, and are longer than the Flower, ſo that they hang out; and each of theſe has an incumbent little Head, or Button, containing the Duſt which is to impregnate the Seed. From the Top of the Rudiment of the Seed, and in the Centre of theſe Filaments riſes the Style of the Flower: at the Top of which alſo is a Button pierced for the Reception of that Duſt, and the conveying of it to the ripening Seeds: one of which follows every Flower, and is of a longiſh Shape.

There are three or four other Kinds of Teaſil mentioned by the Writers on Botany, but they are of no Importance to the Farmer: this large Kind, which is a Native of England, and many other Parts of the World; and is thus improved by Culture, is the only one he needs regard.

CHAP. XCII.

Of the proper Soil for Teaſil, and its Culture.

TO know in what Soil Teaſil will beſt ſucceed, the wiſe Method is to ſee where it grows wild. It will live in this State almoſt on any Ground, but it never is ſeen to thrive ſo well as when it chances to ſtand on a Clay, among which there are ſome Stones.

Therefore if the Farmer who reſides in the Neighbourhood of a Cloth Country, have a Piece of ſtony, clayey Ground, that is fit for little elſe, and is ſcarce worth the Charge of Manure, let him ſow it with Teaſil: he will be at no other Expence than a Couple of good Plowings, and he will have a Crop that will bring him a much larger Profit than he could make any other Way from ſuch a Piece of Land, without a great deal of Dreſſing and Expence.

There is not any Plant whoſe Culture is leſs underſtood than this, though nothing is ſo eaſy. Moſt adviſe the ſowing it in Spring, and conſequently a great deal of Trouble in weeding; and ſome allow it two Years Growth upon the Land. Theſe Methods loſe Time, and create Expence, and nothing of this is neceſſary.

The Courſe of Nature in the Production and Growth of the wild Plant is this. The Heads ripen in July, the Seeds fall out, and take root in the Ground; they ſhoot up large Leaves which ſtand through the Winter, and in Spring the Stalk riſes in the Midſt of them; which, toward the End of Summer flowers, and is in its Perfection.

'Tis ſtrange, that in the Cultivation of an Herb which is an abſolute Weed, and the Method of whoſe Growth naturally, and without Care, is ſo obvious, more have not been led to follow the Path thus beaten for them; but in departing from it as ignorantly, as wantonly, have given themſelves a great deal of Expence and Trouble.

'Tis certain, that if Teaſil be ſown in Spring, Weeds will riſe with it, and muſt be held up, becauſe they grow quick at that Time; but in Autumn they are not ſo numerous, nor of ſo quick Growth, and therefore the Plant will get the better of them. This is alſo the more the Caſe, becauſe of the natural Soil of the Teaſil, which being clayey, is one wherein few Weeds grow, and thoſe not vigorouſly. On this depends the proper Culture of the Teaſil, which we ſhall therefore direct the Farmer to obſerve in the following Manner.

If a clayey and ſtoney Soil be at hand it is beſt; if not, an abſolute Clay will do. In either Caſe let him begin the Management and Preparation of it in Autumn, as early as he can: the ſooner the better always; becauſe the quicker the Seed is got, the more Strength it will have in the Shoot before Winter.

As ſoon as the Ground is clear of any other Crop, if it have had any on it, let it be plowed deeply with the four coultered Plow: after this let it be torn to Pieces with the great Harrow; and when it has lain a few Days, plowed deeply again; this laſt plowing is to be followed by another harrowing, and then it is ready for ſowing.

While the Land is in this Preparation, let the Farmer ſeek out for Seed, and let him take eſpecial Care that it be ſound and new. The Quantity to be allowed is, a Peck to an Acre; and it is to be ſown by Hand, and harrowed in.

This

This done the Ground may be left intirely to itſelf till the Plants are up, and then there will require only one hoeing with the Hand Hoe for the whole Buſineſs.

When the Plants are up, and of ſuch a Size that the ſtrongeſt may be diſtinguiſhed from the pooreſt, let the Hoers be ſent in. They muſt have Orders to deſtroy the few Weeds there are upon the Ground, and to thin the Plants, cuting up the weakeſt and leaving the moſt promiſing, at about a Foot and a half Diſtance, this is all that needs be done. This hoeing, ſlight as it is, will diſpoſe the Ground to receive the Dews and Rains; and the remaining Warmth of the Weather and following Showers, will invigorate the Roots, ſo that the Leaves will grow larger till they meet, and ſo cover the whole Field: after this no Weeds can riſe; they will keep the Ground moiſt, and by that Means nouriſh the Roots: in Spring the Stalks will riſe, one in the Center of each Cluſter of Leaves, they will grow of themſelves in their natural Manner, and toward the End of July will be full of Heads.

This is the Time of gathering them, and it is to be done by cutting off the Stalks, and tying them up in middling Bundles. Theſe Bundles are what they call Staves of Teaſil, and they require nothing more than to be dried, in order to be fit for Uſe.

If the Weather be fair they take no more Care as to the drying, than to ſet up the Bundles in the Field, leaving it to the Sun and Wind: if there be Rain they houſe them, and dry them with a little more Trouble.

The common Produce is about a Hundred and fifty, or from that to two Hundred Staves or Bundles to an Acre; and at the pooreſt Rate they are a very profitable Crop for ſuch Land as they have grown upon, and the ſmall Expence of raiſing.

The greateſt Part of the Teaſil raiſed in England, is in Yorkshire, and in Essex; the Heads being dried, are uſed to lay the Nap of coarſe Cloths, or others, in the firſt Manufacture.

Thoſe who chuſe the Method of ſowing in Spring, muſt do it exactly in the ſame Manner as has been directed for the doing it in Autumn, but the other Way, except under very particular Circumſtances, is greatly preferable.

If any chuſe to cultivate this Plant in the Drill and Horſehoeing Way, there is no doubt but it will anſwer very well, for nothing can furniſh it ſo plentifully with Nouriſhment as Horſehoeing; and in that Way alſo the Surface of the Ground would not be at any Time ſo perfectly covered by the Leaves as it is in the other, becauſe the middle Part of the broad Intervals would certainly be free.

In this Way of raiſing Teaſil the beſt Practice would be to plant it in double Rows, with two Foot Partitions, and five Foot Intervals between Pair and Pair of Rows: the Number of Plants would be leſs upon an Acre in this Way, but probably the Number of Heads would be greater, becauſe each Plant being ſo well nouriſhed would afford a larger Number, and certainly they would be better in their Kind.

CHAP. XCIII.

Of Aniſeed.

EVERY one knows what Aniſeed is, and how great a Conſumption there is of it. We receive it from the Levant, where it is cultivated in the Greek Iſlands, and ſome other Places; but it may as well be raiſed at Home. Not only we are remiſs in this Article, but all other Nations, for the World is in a Manner ſupplied from thoſe few Places: there is no Reaſon the Backwardneſs of others, in what regards their own Intereſt, ſhould be a Rule for us to be alſo backward: not only Reaſon and the little Experience we have in Gardens, ſhew that the Plant will perfectly well live with us; but the more full and perfect Experience of the Fields where it has been ſown, and has come up, and grown to a perfect Maturity.

Let the Farmer be informed of every thing it is in his Power to raiſe upon his Land; and then let him uſe his Diſcretion, to ſuit the Crop to the Condition of his Land, and Circumſtances of his Farm.

The Plant which produces this Seed, and is called the Aniſe, and vulgarly the Aniſeſeed Plant, is not altogether unlike Parſley in its Manner of Growth. 'Tis about the ſame Height, and branches out much in the ſame Manner, and carries its Flowers and Seeds in the ſame Way in Tufts.

It grows to two Foot and a half in Height. The Root is long and white, but what is moſt ſingular in it is, that there is a great deal of Difference in the Shape of the Leaves, thoſe which riſe firſt from the Root, are compoſed of roundiſh Parts, and thoſe on the Stalk are more divided; 'tis theſe latter that have moſt the Aſpect of the Parſley Leaf, and they are of a pale Colour. The Tufts of Flowers are moderately large, but the ſeparate Flowers are ſmall, they are white, and are ſucceeded each by two Seeds which grow together.

The whole Tuft of Flowers, which is what is called an Umbell, has no ſurrounding Leaves as thoſe of many other Kinds have; and the ſeparate Flowers whereof it is compoſed, have ſcarce any viſible Cup. Each Flower conſiſts of five little Leaves, which are of an oval Figure, and bend backward: in the Center riſe five ſlender Filaments, each having at its Top a little Head or Button; among theſe grows a ſingle Filament, divided into two at the upper Part. This is the Style of the Flower, it grows upon the Rudiment of the Fruit, which is compoſed of two Seeds joined cloſe together, which ripen and ſeparate when the Flower is fallen.

CHAP. XCIV.

Of the Cultivation of Aniſeed.

ANISE is to be ſown in Spring, but the Ground muſt be well prepared for it before Hand. Therefore let the Farmer who intends

tends to raiſe it; look out for a proper Piece of Ground during the Summer, that he may be ready to go to work upon it in Autumn.

The proper Soil is a dry rich Loam; that is, ſuch a one as has a good deal of Sand, but little Clay, and a good Quantity of fine Mould in its Compoſition.

The beſt Situation is in a warm Valley, where the Place is well ſheltered by Hedges, and is not in the Way of Wet; for Aniſe is a tender Plant, and will by no Means bear Water to lodge about the Roots.

Such a Piece of Ground being choſen, let it be well plowed up in Autumn, and a Quantity of half rotted Dung ſtrewed over it. Let the plowing be repeated two or three Times between that and Spring, that the Manure may be well mixed among it; and then let it all be harrowed fine, till it be as level and ſmooth as a Border in a Garden. It is then in a Condition to be ſowed, but the Weather muſt be watched. Aniſe is a quick growing Plant, ſo that it need not be hurried into the Ground in the very Beginning of the Spring at all Adventures; the Danger to which it is liable is altogether that of the cold Rains, which ſometimes fall early in this Seaſon, and it may be eaſily guarded againſt theſe, by keeping the Seed out of the Ground till the dangerous Period is over.

The Farmer may be diſcouraged by what he meets with in ſome Writers of Credit on this Subject, who talk of the great Tenderneſs of Aniſe, and the Difficulty of raiſing it: but it is all owing to their having ſown it too early. They direct FEBRUARY as a proper Time, whereas it will ſucceed very well if ſown in APRIL. GERARD, an Author of Credit, might have taught thoſe Writers better, he ſays he had frequently ſown it in his Garden, where it always grew very well; and perfectly ripened its Seeds, if the Weather proved any thing favourable.

There is therefore no Difficulty in raiſing Aniſe in ENGLAND, and very little Hazard, unleſs what riſes from Ignorance: this is worth ſearching to the Bottom, becauſe it may prove a very valuable Commodity: the Price is not great as we import it, but when we conſider the vaſt Quantity of Seed which all theſe umbelliferous Plants bear, we ſhall find that it will amount to a very conſiderable Value from an Acre.

The Ground being ready, the next Thing the Farmer is to do is to ſee that he get good Seed, the Soundneſs is one great Article, and the Freſhneſs is another. If he buy ſuch as is faulty and decayed, he will have a poor Crop, becauſe one half of it will never ſprout; and if it be old Seed, though good and ſound, yet it will from that alone be made very inconvenient to him, on Account of the late ſhooting. As we have adviſed him to ſow it late in the Spring, it ſhould riſe ſoon, or he ſhould be prepared for its lying longer in the Ground, by knowing it would do ſo, that he might ſow it ſomething ſooner. Gardeners know that old Seed, though good, always lie longer in the Ground than newer of the ſame Kind, and this is particularly ſo in Aniſe.

Therefore let the Huſbandman be very careful in examining the Seed he buys; the beſt Rule that can be given him is, that its Weight and Cleanneſs are Tokens of its being ſound, and the Brightneſs of its Colour ſhews beſt its being new.

The Land being prepared, as we have directed, the Seed is to be ſown lightly and ſparingly over it; and when it is come up it is to be hoed by the Hand Hoe, the Hoers cutting up ſuch Weeds as have riſen among it; and thinning the Plants to about ſix Inches Diſtance every Way.

In this Condition they are to ſtand till they have flowered, and the Seed is ripened, and the Time for gathering them is juſt when it begins to harden.

The beſt Way of gathering this Crop is by pulling up the Plants by Hand, for they root very ſlightly; after which they are to be houſed, that they may dry without waſte, and the Seed is then to be thraſhed off for Sale.

CHAP. XCV.

Of Caraway Seed.

THIS Seed is as well known as Aniſe, and it grows upon a Plant ſomewhat reſembling it in its general Form. It may be cultivated in ENGLAND in the ſame Manner as Aniſe, but with leſs Charge and Hazard, for it is hardier; and it yields the greater Advantage, as it does not periſh when the firſt Quantity of Seed is ripened, but lives ſeveral Years, producing ſucceſſive large Crops.

The Method of raiſing it is much the ſame with that we have deſcribed for Aniſe, but eaſier; and we have therefore given the other firſt, that the Farmer who ſhall not chuſe to attempt that, may be acquainted with every thing neceſſary to be known about this, which he will leſs fear.

The Caraway Plant grows four Foot high; the Root is long and white, and is of a pleaſant Taſte. The Leaves which riſe from the Root, are large and very finely divided. The Stalk grows up in the Midſt of theſe, and is hollow, ſtriated on the Surface, and divided into a great many Branches. On theſe ſtand Leaves like thoſe that riſe from the Root, only ſmaller, all divided into very narrow and fine Parts: at the Tops of the Branches grow Tufts or Umbells of white Flowers; after which come the Seeds, growing two together. The whole Tuft has no Leaves about its Bottom, nor have the ſingle Flowers any Cup, except ſo ſmall a one as is ſcarce obſervable: in theſe Particulars, as well as in its general Growth, it agrees with Aniſe. Each Flower is compoſed of five little Leaves, which turn back at the Extremities. In the Center of each riſe five ſlender Filaments, each having a little Button or Head, and among theſe grow up two fine Threads, which are the double Style of the Flower; after the Flower is fallen the Seeds grow two cloſe together, and ſeparate when they ripen. There are two or three other Kinds of the Caraway Plant, named by Writers on Botany, but only the common Sort, which we have here deſcribed, is worth the Huſbandman's Notice.

The proper Soil for raiſing it is a deep, rich, mellow Earth, the more like Garden Ground

the better. If there be ſome Sand among it, provided that be not in too large a Quantity, it is not the worſe, wherefore a rich Loam will do; but in general, the richer the Soil the greater will be the Produce.

To prepare this Land for Caraway it ſhould be plowed up in Autumn, and again in the Beginning of February: a Week after this it is to be harrowed carefully, and laid even, and then it is ready for ſowing.

Caraway Seed is plentiful enough, and cheap enough, but let the Farmer ſee he buys ſuch as is ſound and good.

The Quantity that is neceſſary is ſeven Pound to an Acre. When this is ſown as evenly as can be, it is to be harrowed in, and then left to ſhoot.

When the Plants are about three Inches high, the Hoers are to be ſent into the Ground, but they muſt, both in this and Aniſe, be well inſtructed firſt in the Appearance of the Plants themſelves, which otherwiſe they will be very apt to cut up among the Weeds.

They muſt hoe up the young Growth of Weeds that will be now found among the Caraway, and thin the Plants themſelves where they are too thick, taking up the pooreſt, and leaving the others at about eight Inches Diſtance every Way.

If this hoeing be carefully done, it will be of prodigious Uſe to the Crop. The Plants will thrive after it in a very ſurpriſing Manner, and they may be, for the future Part of the Summer, left to themſelves, for they will get ſo much Strength before a new Crop of Weeds riſe, that they will have no Chance among them.

The Crop is not to be expected the firſt Summer. Some of the Plants will run up to Seed, and if ſo many do as are worth cutting, it may be done, but often 'tis otherwiſe; ſo that the Farmer muſt not lay his Account to have a Crop the firſt Year.

The Field is to lie the whole Winter untouched: in Spring it is to be hoed again, and the ſame in Auguſt, and ſoon after this laſt hoeing the Seed will ripen. There will be a very large Crop, and the ſame for three or four ſucceeding Years, which is to be cut up, dried, and thraſhed for Sale.

Having thus treated of the ſeveral Particulars under this Denomination, we ſhall give a few general Chapters on the great Article of ſowing, and with that cloſe the Account of Tillage and its Objects.

CHAP. XCVI.

Of Sowing.

IN the Article of Sowing two Things are to be conſidered, the Nature of Seed, and the Temper and Quality of the Ground. Some Kinds of Seed will bear Wet, others will be injured by it; and ſome Land is fitteſt for Sowing when wet, other Kinds when dry.

It is a Rule among the Gardeners to ſow dry and ſet wet, but this will not hold altogether with the Huſbandman. His Fields are a larger Garden, and he muſt not be confined to ſuch little or narrow Rules.

As to the Temper of the Ground proper for Sowing, that depends upon its natural Condition, all Lands ſhould have ſome Moiſture when ſown, but the drieſt ſhould have moſt.

A Land naturally moiſt may be ſown in any Weather, but dry Soils may be ſown in Weather that is very wet, provided the Seed be one that will bear wet.

Wheat ought be ſowed when the Earth is moiſt. This is an Exception to the Gardener's Rule, and it is the moſt important Article in the whole Profeſſion. It can hardly be too wet for the Sowing of Wheat, for this Seed not only will bear wet but requires it: on the contrary, Rye, as we have ſhewn, cannot bear it, nor requires its Aſſiſtance. Rye cannot be ſown too dry: it always thrives ſo much the better.

Rye that is ſown upon the drieſt Land, and in the drieſt Seaſon, will come up without any Rain; but Wheat will lie as if it were dead in the ſame Weather.

The Farmers obſerve the Seaſon of the Year for Sowing, and when that is come they get in their Wheat be the Weather what it will, for this Reaſon it ſometimes will lie ſix Weeks in the Ground without any viſible Shoot, but the firſt good Rains bring it up, if they come in Time: if not there is but a poor Appearance, for often half, or the greateſt Part, will ſpoil with ſo long lying in the Earth.

Let the Farmer in this, as in all other Things, follow Reaſon and Experience, rather than a blind Cuſtom. Let him uſe the common Seaſon for Sowing his Wheat, if the common Weather happen in it; if not let him ſtay beyond that Time. Thoſe who fixed the Time of Sowing Wheat, did it becauſe Rains uſually fall at that Seaſon; if any Year it ſo happens that they do not, let him wait till they have fallen. He will thus better obſerve the Senſe of the antient Rule, than thoſe who ſtick to the Day.

Wheat is not the only Kind that requires Moiſture: but moſt ſucceed very well; nay many of them beſt without it.

Black Oats require as much Moiſture as Wheat, therefore let the Farmer never ſow them but in ſuch a Seaſon: on the other hand, Barley does very well in a dry Time, and all the Summer Corn in general.

Nature takes Care of the Seeds of wild Herbs. They fall at any Time when they are ripe, and be the Seaſon what it will they grow. Some are loſt but enough remain. This is plain, becauſe no Kind of Plant whatſoever has been loſt ſince the Creation. We read in very old Authors of the Herbs of old Time, they do not mention a great Number, but all they have deſcribed diſtinctly, are found to this Day.

The later Writers have been more curious in ſetting down the Names and Figures of a vaſt Variety of others, and in the ſame Manner all they have named continue in their Places; or if they are loſt in one, they are found in another.

Theſe are ſown as Accident directs, and they ſucceed: here is no Regard to wet or dry, yet they proſper. This is true, but let it not mif-

lead the Farmer. Far from too much, there is too little Care taken in the Sowing of Corn, let him be doubly aſſiduous not remiſs; theſe Plants which Nature ſows at random, are only to keep up the Species.

The Wheat ſown by the Huſbandman is to be conſumed in Food in the far greater Part: and after it has fed Millions, enough is to remain for keeping up the Species. This is a great Difference, and requires all his additional Care.

It may be ſaid in the ſame Manner, that the Earth does for theſe Seeds of Herbs that are wild, without Tillage, or any careful Manner of placing them in the Ground; they fall as Chance directs, and yet they grow. The Anſwer is the ſame, that a ſmall Supply only is wanted from them, therefore this caſual Way of Sowing is enough; if much of the Grain were required for other Uſes, then Care and Culture would be needful.

The Creator of all Things ſaw at firſt the Condition of Wheat, and the other Grains He intended for the Support of Man's Life, and He knew they would therefore have his Care and Labour for their Production. The others which were of no ſuch immediate Uſe or Value He foreſaw would be taken little Care of, He therefore provided for their ſucceeding of themſelves. Proviſion is made accordingly, and it is wonderful in what various and elegant Manner.

They are in general incloſed in a Caſe, ſerving as a Womb, in which they are retained till in perfect Maturity, and which then opening diſcharges them to the Ground. They therefore do not fall till ripe, and fit for growing; and they are ſuited to preſerve themſelves in a proper State, and keep in a proper Place, in a ſurpriſing Manner. Thoſe intended to root about the Mother Plant are ſmall and heavy, ſo that falling they take Root at once, this we ſee in Henbane, and many others. Thoſe which are intended for ſpreading are winged with Down, as thoſe of the Thiſtles. Such as by their Lightneſs would be carried away by every Puff of Wind, have Hooks and Prickles to detain them, as Seeds of Clivers, Avens, and Burdock. Agrimony Seed alſo is rough, ſo that it lays hold of any thing. Many of theſe are intended for the Banks of Fields, where they could not lie but for theſe Hooks and Prickles, that ſerve to keep them in their Places. The Seeds of ſome, which are to be ſcattered at a Diſtance, are lodged in Caſes or Fruits, that toſs them out by their ſpring in breaking, ſuch as Wood Sorrel and the wild Cucumber; and ſome, that they may not riſe in Cluſters together, have a Kind of Wings by which they are influenced by the Wind, to move about upon the Ground; the Fruits of ſome Trees are of this Kind: the Aſh Key and the Pine Kernel are an Inſtance. As this provides againſt thoſe Trees riſing cloſe to one another, in which Caſe they could not thrive, ſo the other is generally given where there is a creeping Root. Wood Sorrel runs a great Way in the Ground by the Root, and therefore this ſcattering of the Seeds to a Diſtance is more uſeful.

Though theſe, and the Generality of wild Herbs, take their Chance as to the Weather, and yet ſucceed enough to preſerve their Species, yet there are ſome that require to be ſown only in peculiar Seaſons. Thus blue Gentian will not ſucceed unleſs ſown when there is wet, but Nature has provided accordingly, for the Seeds are lodged in a Caſe that hold them firm in dry Weather, but ſplits at the firſt Drop of Rain that falls upon it.

Thus we ſee Nature provides for Weeds by various Means, though they be little regarded. Corn is left to the Care of Man, becauſe of its Value, let him not therefore neglect it. It requires a particular Caution and Attention, as well as Labour, to raiſe it, but the Trouble and Expence are well returned. He who underſtands beſt how to employ his Labour will have the beſt Crop.

Nothing is more ſlightly or inconſiderately done than the Sowing in the common Way. We ſee that a certain Time of the Year is fixed upon for doing it, without regard to the Weather, which ought to be the chief Point in View on that Head; and in the uſual Way of doing it the Seed is ſcattered at Random, from the Hand of an unſkilful Perſon, and covered very unequally. It falls too thick in ſome Places, and too thin in others: and in ſome it is buried ſo deep it cannot riſe, while in other Places it is burnt up by lying naked on the Surface.

Inſtead of employing that judicious Care ſo needful in the ſowing Corn, Man here ſcatters it more at Random than the Seeds of the worſt Weeds fall by Nature.

Every Seed has its proper Weather for Sowing its proper Thickneſs upon the Ground, and its proper Depth at which to be covered: theſe are the three great Articles in Sowing. We have ſhewn the Regard that is to be had to the Weather, for the different Kinds; and the Rules by which their Depth and Diſtance may be found. ENGLAND had great Obligation to that Earl of CASTLEMAIN who brought over the original Drill Plow, or Sembrador, from SPAIN; and the World has great Obligations to LEUCATELLO, who invented it; but their Services would have been of little Uſe if not of late revived by Mr. TULL. They had ſlept may Years, and would have been altogether loſt and forgotten. His Praiſe therefore is no leſs than that of the Inventor or Importer of the Machine.

CHAP. XCVII.

Of the Nature of Wheat Seed, and the particular Manner of ſowing it.

THE Reaſon why Wheat requires a particular Care, and a particular Seaſon for the ſowing is, that it is a tender Grain. Rye is hardy, and therefore will ſucceed, as we have ſhewn, under the ſame Condition wherein Wheat will come to little.

Of all our Grain Wheat is leaſt able to bear the Severity of Cold; and yet from its Time of Growth 'tis neceſſary to ſow it before Winter. It has therefore all that hard Seaſon to get thro', and this is the Difficulty.

As it muſt live through the Winter, the Farmer

mer is to defend it as well as he can againſt the Cold, which it is ſo ill able to bear; and the beſt Way he can do this is, by taking Care that the Earth lie hard about it during that Seaſon. this is in a great Meaſure provided by ſowing it in wet Weather, the Soil then cloſing and caking about it; but this brings on another Difficulty. Wheat, of all Corn, requires the moſt Nouriſhment; and we know it cannot ſearch for it by the Roots, unleſs thoſe Roots can ſpread; nor can they do this except the Ground be properly looſe and free. Therefore, as the Condition of Wheat requires the Ground to be compact about it in Winter, ſo it requires it alſo to be looſe in Spring. This is very difficultly to be managed in the common Way of Huſbandry, but it does very well in the drilling and horſehoeing. The Depth at which it is let in by the Drill, gives the Earth Opportunity to cloſe about its Roots, and defend it from the Froſts; and the breaking the Ground between the Rows, by hoeing in Spring, divides the Soil, and makes Way for them to paſs in Search of Nouriſhment.

Therefore the Drill and Horſehoeing Huſbandry is moſt of all ſuited to Wheat, which is the moſt valuable and profitable Grain; 'tis fit the Huſbandman perfectly underſtand the Nature of this capital Grain, if not he will forfeit half the Profit of his Harveſt by the Sowing. There are general Rules for Sowing which hold true in moſt Caſes, but Wheat is an Exception to others of them, beſide that we have named.

'Tis a Rule to ſow on the Ground as ſoon as 'tis plowed, that the Seed may have the Advantage of the freſh Tillage. This to moſt Kinds is very great; but with Wheat another Method is to be followed.

Let the Land be plowed when it is dry, and let it lie till there come Rains to wet it. 'Tis proper to wait for this Advantage, though the Earth lie three Weeks before Sowing, after the Plowing.

If the Land be a ſandy Loam, the clayey Part of which is binding, 'tis beſt to ſow it dry, as well as plow it in that Condition. In this Caſe let the Sowing come directly after the Plowing.

Theſe are the general Rules, but let them be underſtood with Diſcretion: though the Ground ſhould be plowed dry for Wheat, it ſhould not be ſo dry that the Duſt ſhould fly; and though it ſhould be drilled wet, it ſhould not be like Haſty-Pudding. Moderately dry and moderately wet is what we mean by the Direction, but it will bear an Exceſs better in the former than the latter.

The Difference between Ground broken wet and dry, may be ſeen in Banking. A Bank made of wet Earth will keep firm many Years, when one of the ſame Ground dry will moulder continually.

Let the Seed Time be deferred till the Ground is ſufficiently wet, and the dry plowed Land will never fail to produce larger Crops than the wet.

The Conſequence of Plowing wet is almoſt equal to that of Banking; a Piece of Land plowed wet in November, will be harder in Spring than one plowed dry in August. All Ground grows hard by lying, and naturally the longer the harder; but this Effect of wet out-does that of the Time, though there be a Third of the whole Difference.

When the Land that has been plowed dry is wet enough for Sowing, let it be once harrowed lightly, juſt to level it, and then let it be ſown.

Wheat may be drilled any Time between Harveſt and November, but in general 'tis better to drill earlier than thoſe who ſow in the common Way, than later.

When Wheat is ſown early leſs Seed is required, when later more. Poor Land ſhould have more Seed than rich, becauſe more of the Plants will be deſtroyed on the poorer Land in Winter. Beſide the Plants thriving better on rich Land, will have each more Stalks, ſo that one of them will be equal to many on poor Ground.

CHAP. XCVIII.

Of the Proportion of Seed Wheat to the Land.

THE Quantity of Seed Corn ſowed in the new Method of Huſbandry is a very conſiderable Article in its Recommendation; the proper Quantity for an Acre of middling Land is from four to ſix Gallons, this will ſurprize ſuch as are not uſed to this Huſbandry, but the very ſmalleſt Proportion here named is often ſufficient.

If the Land be rich, and be ready for drilling early, four Gallons of middling Seed will be enough. The Danger of drilling it too thick is, that it will fall; and when too thin the Quantity is often diminiſhed yet farther, by its blighting in Spring. When it is planted early leſs ſerves, becauſe it is more ſafe; that which is drilled late being found, by all Experience, more liable to Accidents from Worms and many other Cauſes.

Where there is Danger of Worms the proper Caution is to plant it ſhallow. Wheat will come up if covered three Inches deep, and it will ſtand very well if not deeper than an Inch; therefore let the Farmer proportion the Depth to the particular Circumſtances and Seaſon of his Sowing. The Way Worms deſtroy Wheat is by eating off the Thread that is continued from the Grain to the Blade. Worms lie deeper in Winter than at other Seaſons, by Way of defending themſelves from Cold, therefore when the Corn is drilled ſhallow they never come near that Thread.

As the Quantity in the Drill Method is much leſs than in the common Way of Sowing, the more Care muſt be taken that it be preſerved. We have ſhewn how it will beſt eſcape Worms; but the Rooks are great Deſtroyers, they muſt be kept off the Land about the Time of its firſt ſhooting. This is the only Period when they are dangerous, but they are very deſtructive then. Boys muſt be employed to fright them away. The Farmer muſt not ſtay till he ſees the Blade up, before he ſets on his Guard. It is true the

Rooks

Rooks will not meddle with it till it has ſhot, but they will ſee this before the Owner. They are ſharp eyed, and juſt when it peeps above Ground is the Time they devour it. They tear it up for the Sake of the Seed, which is then plump and full: when the Shoot has been up a few Days the Flower of the Seed is exhauſted, and they will not meddle with it.

That Wheat is ſafeſt from Rooks which is planted neareſt the Harveſt Time, there is then a great deal of Corn ſcattered on the Ground, and they feed well. While they have Plenty of this they will never look for the other, but when hungry they are very bold and very cunning.

CHAP. XCIX.

Of ſowing Turnip Seed.

WE have obſerved that about Michaelmas is the beſt Time for ſowing Wheat. Much ſooner it cannot be ſown; and it is not prudent to do it a great deal later. In Turnips we are not to be particular to a Time. They may be very well ſown from May to August; and in this the Farmer is to guide himſelf by the Nature of his Land.

In a moderate Piece of Ground, Midsummer, or a Week before, or a Week after, is the beſt Time; in poorer Land they ſhould be ſown ſix Weeks ſooner, and ſuch as is in very fine Condition for them it may be let alone till ſix Weeks later. Experience ſhew that Turnips, on a very good Field, will be as forward if ſown at this late Time, as on a poor one at the earlieſt.

As to the Quantity of Seed, we have obſerved on another Occaſion, what a vaſt Difference the Drilling makes from the common Method; four Pounds is often allowed to an Acre in the common Way, and in the Drilling Method four Ounces is full enough.

In the Drill Method Wheat may be ſown upon the ſame Piece with Turnips; and this is to be managed thus. The Turnips muſt be ſown early, they will then be well grown by Michaelmas; and that is the Time for ſowing the Wheat. The Turnips being in diſtant Rows Wheat may be ſown between them, the Earth being properly broke for that Purpoſe. Almoſt all the Earth may then be taken from the Turnips; and thus they may ſtand with the Wheat during the Winter. In Spring they are to be pulled up, and the Wheat is then to be left to take all the Advantage of the Ground till Harveſt.

CHAP. C.

Of ſowing Beans.

THE Seaſon for ſowing Beans is February, and the moſt proper Earth is ſuch as is ſtrong, and will retain ſome Wet. The Spring Rains follow this Sowing, and the Crop ſeldom fails unleſs for want of a due Moiſture, ſo that it muſt be an unnatural Seaſon alone that can prevent their thriving if thus ſown. Provided they have this Advantage they get a good firſt Shoot, and no Weather that comes afterwards can hurt them; the richer the Land the better for Beans, provided it have this Firmneſs to hold the Wet. The richeſt Soil will not anſwer without this Quality, for if they ſhoot well at firſt they will be loſt if there come a dry Summer. A loamy Field, with ſome good Mixture of fine Earth, is the proper Place for this Crop, few know the Value of Horſe Beans for want of underſtanding the proper Soil, Seed Time, and Manner of ſowing them; we ſhall endeavour to inſtruct our practical Huſbandman on each Head, from the Reſult of Experience.

We have mentioned the Improvement of clayey Soils by Sand, in the Beginning of this Work, a Soil ſo altered and amended becomes a Loam of the beſt Kind; theſe Clays ſeldom fail to have rich Earth among them, and though in their original and natural States they locked it up, and it was of no Advantage, yet when thus divided by the Sand, broken by Tillage, and calcined by the Sun and Air, from frequent turnings, they become a very rich and very ſtrong Land, and they are able to retain a great deal of Moiſture: theſe therefore are the very beſt Soils for Beans. The next to theſe are ſuch as by Nature come neareſt them; that is, ſuch as are loamy, with a good Mixture of Mould among them.

Let a Field like this be choſen for Beans, let them be ſown the third Week in February, and if they have the Advantage of a dripping Spring, the Crop ſhall be equal in Value to one of Barley.

We have ſhewn what is the great Advantage of Horſehoeing to Wheat, in the cauſing a great Number of Stalks to riſe from one Root, and each to have a great deal of Corn. The ſame Effect is produced by this Practice in Reſpect of Beans. I have counted ninety-five Pods upon one Stalk, all well fed and full of Seed well nouriſhed; and a common Number is ſixty or ſeventy on a Stalk when thus managed. In this Caſe the Land cannot eaſily be turned to a better Account. As loamy Soils are the beſt for Crops of Beans, ſandy are the worſt, yet there are wet Sands that have ſome Clay in their Compoſition, though not enough to get them the Name of Loams, that ſucceed very well with this Growth; in theſe Caſes the Seed ſhould be always drilled in Rows at four Foot Diſtance, and a Farmer who manages properly may get a good Crop of Turnips between.

When any one has a Deſire to raiſe Beans upon a Land that is not naturally ſuited to them, he muſt encreaſe the Quantity of Seed, and be particularly careful in the ſowing. Many of the Plants will come to little; and if added to this Part of the Seed be loſt by Careleſſneſs in getting it into the Ground, and the reſt bear but a poor Quantity, there muſt be a miſerable Proſpect. Dry Weather always hurts Beans, and when they ſtand thin it deſtroys them.

When too few Plants riſe the Weeds will come up too abundantly, and when thoſe that come up are not ſtrong, they get Strength and overpower them. On good Land three Buſhels will ſow an Acre, but it is better, when it is any

thing leſs than the beſt, to ſow four, and on Soils that are poor or dry five Buſhels.

There are two Ways of ſowing them in the ordinary Huſbandry, by the broad Caſt and plowing them in; for this the Seedſman follows the narrow Wheel Plow, and throws in the Seed from his Hand in a direct Line, all the Way along the Furrow: this is called ſpraining them in. The Furrow is left open in this Way by the Plow, but the next turn covers it, and the Beans are buried to a good Depth.

Another Way of ſowing, or rather planting Horſe Beans is by Hand, and it is practiſed in ſeveral Parts of ENGLAND, at a very moderate Expence, Women do it, and the Method is this.

The Land is plowed light, and the Women draw Lines in it at a Foot and half Diſtance. They have an Inſtrument they call a Dibble or Dibber in their Hands, and Beans in their Apron, and they work by the Line; the Dibber is an old Spade Handle cut off to five Inches length, and tipped at the Point with Iron. They have this in their right Hand, and they take out the Beans from their Apron with their Left. They ſtrike the Dibber into the Ground, and drop a Horſe Bean into the Hole. They thus plant the Beans at about three Inches Diſtance, in Rows eighteen Inches aſunder. This is a very proper Poſition, and a very regular Method of planting them, and 'tis done with ſo much Eaſe that the Expence is very moderate.

When the whole Field is planted they go over it with a Harrow, which ſufficiently covers the Beans; and then they give them two Handhoeings before Harveſt. This is very nearly of kin to the Drill and Horſehoeing Huſbandry, but it is not equal to it in Advantage, as we have ſhewn; for this Handhoeing only ſcratches the Surface of the Ground, whereas the other tears and breaks it to ſuch a Depth, as to invite the Roots of the Crop where the Nouriſhment is moſt abundant.

In WILTSHIRE they plow only lengthwiſe, never acroſs, and ſow their Beans by the broad Caſt twice in a Place, they then harrow them in, and ſo leave them to their Chance.

In other Places they don't harrow till about the Time when the Beans are juſt going to ſhoot, then they go over the Ground carefully with the common Harrow. This tears up the young Growth of Weeds, and breaks and divides the Ground at the Surface, covering up the Heads of the Beans; immediately after the Harrow they draw over a moderate Roller, which fixes the Earth at the Surface, and levels all for the Scythe at Harveſt.

The Drill Method of ſowing is beſt of all, and the Diſtance between the Rows not only gives Opportunity for Horſehoeing, which vaſtly ſtrengthens the Growth, but the Plants having a free Paſſage for the Air to their Bottoms, bloſſom and bear Fruit all the Way down. This vaſtly encreaſes the Quantity, and at the ſame Time ripens them better.

Though the Horſe Bean is what the Farmer means whenever he talks of his Bean Crop: yet this is not the only Kind that is cultivated in Fields, they ſow five other Sorts in the ſame Manner about LONDON, and in other Places where there is a large Demand, for the ſupplying of the Markets; theſe are the Windſor and Sandwich, the Broadſtock, the Liſbon and the Hotſpur, this laſt is a ſmall Bean, but is valued for its early Time and good Flavour.

There is alſo another Kind that is very properly brought into Uſe of late, and ought to be introduced univerſally; and this is properly the Country Farmer's Concern: this is the Tick Bean, it is properly and truly a Horſe Bean, but it is much broader than the common Kind, and anſwers better on every Occaſion. This is beſt planted by Hand with the Dibber, and the Rows ought to be at leaſt two Foot aſunder, it yields vaſt Crops.

The common Method of managing theſe is by the Hand Hoe, and it does a great deal of Service, though nothing equal to what would be by the Horſehoeing. They give them two Hoeings in this Manner; when they firſt ſhoot up they come in with the Hoe, and cut up all the Weeds between the Rows, and at the ſame Time earth up the Beans: then, when they are about ſix Inches high they come in and hoe them up again, this ſecond Earthing is of great Benefit to the Beans, and the Weeds being deſtroyed at this Growth, are rarely troubleſome again.

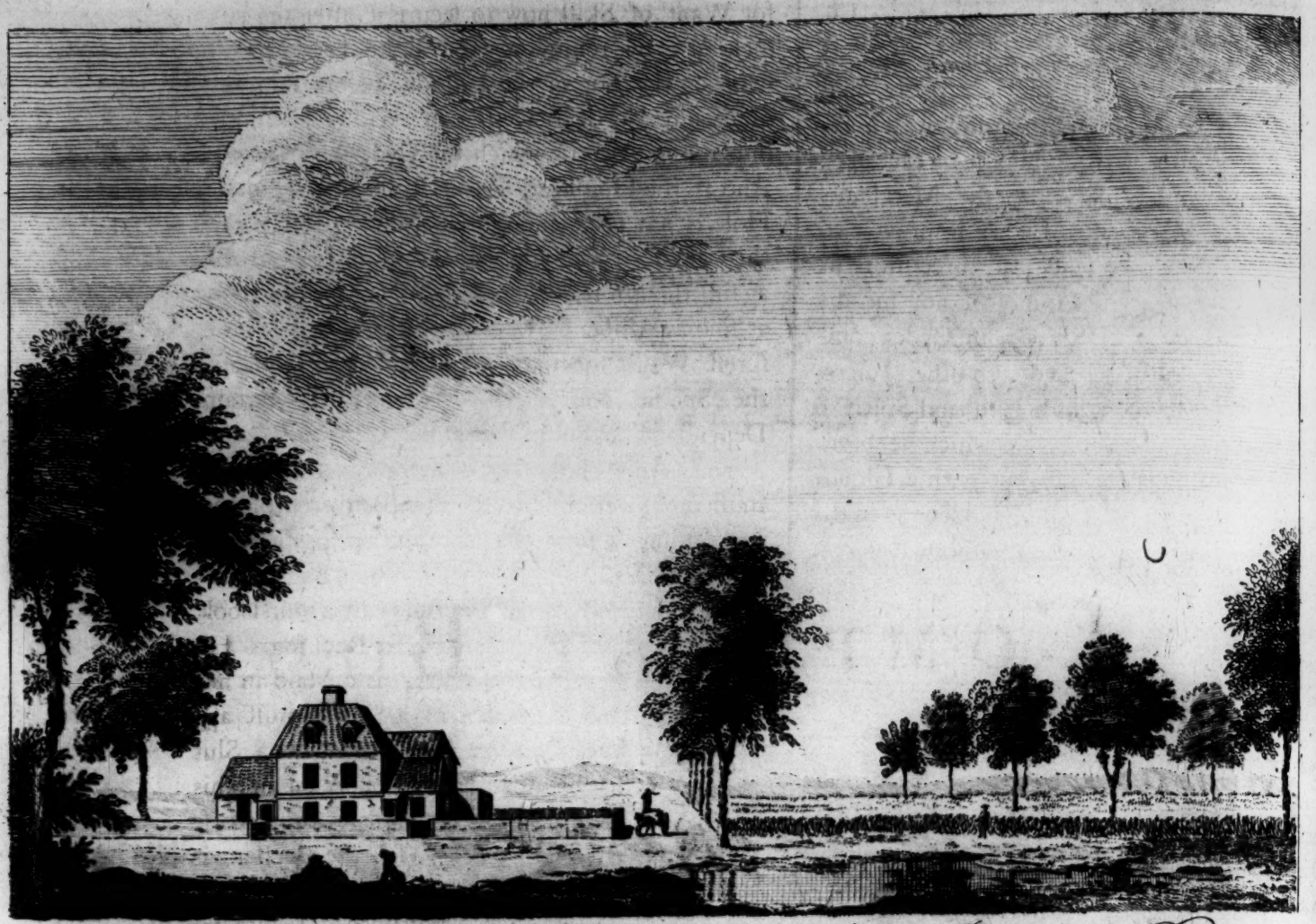
Some have ſuppoſed, from hearing the Huſbandmen of other Counties talk of ſmall Ticks and large Ticks, that there were two Kind of Beans of this Denomination, but this is not the Caſe. There is but one Kind of Bean properly thus called. It is a Horſe Bean of the Size of the Hotſpur Bean, and is hardy and very fruitful. What ſome call the ſmall Tick is only the common Horſe Bean.

The Tick Bean is more hearty and nouriſhing than the common Horſe Bean, but as it is larger it requires longer drying. When this is done imperfectly in the Field, the Way is to finiſh it on a large Floor in an airy Place, or in a Kiln. The ſafeſt Method of keeping them is to ſplit them and dry them afterwards; in this Caſe they are never liable to any Accident. They mix excellently with Oats, Chaff or Bran, and are of the greateſt Service to the Cattle.

There have been Times when Bean Bread was eaten for want of better Flour, and no Harm ever happened from it: on the contrary, it was found to be more ſtrengthening than any other.

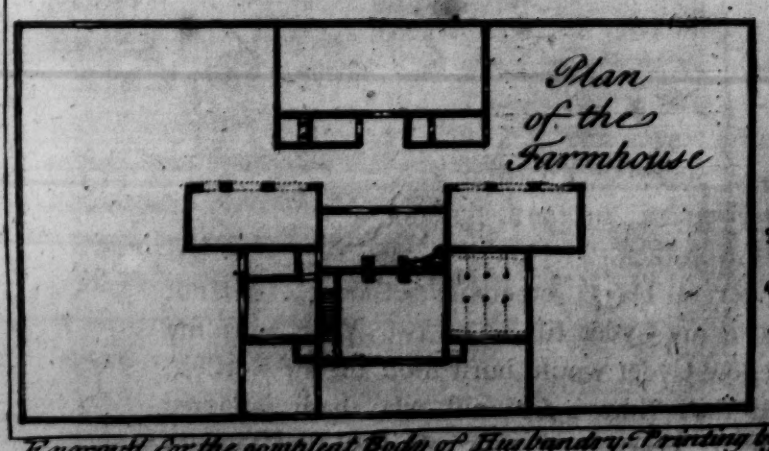
From what we have here laid down from repeated Experience, let the Farmer learn the Value of a Crop of Beans; but at the ſame Time let him weigh with himſelf the Profit he will have from other Crops, and the Condition of his Land. Let him beware that he is not led away by the Benefit of any one Kind, but chuſe the beſt.

End of the NINTH BOOK.



An Elevation of a Farm House, with the Orchard Planted at Distances, and the Ground Cultivated between.

The Ventilator for Milk



Plan of the Farmhouse

The Orchard

Plantation

Engraved for the compleat Body of Husbandry: Printing by the Kings Authority in Weekly Numbers at 6d. each.

A

Compleat Body of Husbandry.

BOOK X.

Of the natural and artificial Products of the Farmer's Stock.

The INTRODUCTION.

WE have conſidered in a preceding Part of our Work, that important Article of ſtocking the Farm, and have acquainted our Huſbandman with the ſeveral Breeds of thoſe Animals which he is to feed upon its Produce for Labour or Profit.

We have ſuppoſed him provided, and have ſince gone through thoſe ſeveral Articles by which he is to procure them Food, and in which he is to uſe their Service: this done, we come in the preſent Book, to treat of thoſe Benefits he receives from them in their ſeveral Products, and the beſt Manner wherein he is able to uſe them to his Advantage.

We divide them into natural and artificial, as they are of two Kinds, properly coming under thoſe two Denominations; one part of them ariſing naturally, and being uſed in the Condition in which he receives them; the other requiring Art and Management to bring them into the State that is fit for Sale.

Of the firſt Kind, or natural Products of the Stock, are Milk and Wool; theſe he receives from the Udder, or ſheers from the Back; and

he may ſell them as they are, that is, in their natural State and Condition; of the artificial Kinds are ſeveral Things ariſing from the Uſe or Manufacturing of the former. Thus Butter and Cheeſe, though originally owing to Milk, yet are not obtained without manual Labour and Art. Theſe we call the artificial Products of the Stock; and under the one or other of theſe Names, we comprehend the whole Produce from theſe Animals, according to the Manner in which it is obtained from them.

We ſhall treat of theſe ſeveral Subjects largely, though in as few Words as the Nature of what we have to ſay will permit. Many uſeful Things there are which the Farmer yet does not know relating to theſe Articles; nor ſhall we omit Matters of Curioſity relating to them, when they tend to explain and illuſtrate ſuch as are of Uſe.

We apprehend that the Farmer of one Place may be inſtructed by ſeeing here the Practice of the Huſbandman in another. There are many Things alſo written on theſe Matters, from which ſeparating the uſeful from the oſtentatious Part, much Knowledge may be drawn.

We propoſe therefore to lay before our Readers, ſo far as we have been able to collect or learn, the Subſtance of ſome have written, and others have practiſed; and upon the whole to build a Syſtem for the Conduct and Management of theſe important Articles; which the Farmer's Reaſon ſhall countenance, and, we doubt not, his Experience afterwards approve.

CHAP. I.

Of Milk, and its natural Production.

IN treating of Milk, the firſt Thing needful is to conſider what it properly and truly is, for on that will be rationally founded all that is added concerning its Uſe.

Milk is a Fluid ſeparated from the nutritious Juice of Bodies, called their Chyle; depoſited by Nature in the Breaſts or Udders of Female Animals, during their Pregnancy, and for the Nouriſhment of their Young.

After the Young is born it comes in greater Abundance: and it will be prepared and furniſhed by Nature in that plentiful Manner, ſo long as it is ſucked by the Young, or any other Way drawn at Times; but when no Uſe is made of it, the Supply ceaſes; and the Milk, as the Expreſſion is, dries up of itſelf.

We have mentioned the Breaſts and Udders of pregnant Females as the natural Place for Milk; but the Curious have diſcovered, and ſometimes Accidents have ſhewn, that it is not limited to that Sex, or that State; Male Creatures, both Human and of the Brute Kind, have had Milk; and among the Females, ſuch as have not been in a State of Pregnancy.

The Roman Charity ſo famous in Hiſtory and Paintings, is an Inſtance of the latter in the Human Species; wherein an old Man confined in a Dungeon, was ſupported with Nouriſhment by ſucking the Breaſts of his Daughter a Virgin.

As to the former Caſe, Accidents have from time to time rendered it notorious; ſo long ſince as the Time of ARISTOTLE, it was known that ſome Men had been found to have Milk in their Breaſts: and CARDAN upon his own Knowledge relates the ſame, averring that there was ſuch a Quantity, that a Child might be nouriſhed by it. PLINY relates the ſame of a Man in his Time, and ALDROVAND of another. Theſe Authorities ſo numerous are not to be doubted; nor is the Thing confined to the human Species in this Inſtance: we have a circumſtantial Account in the Philoſophical Tranſactions, of a Weather Sheep giving ſuck to a Lamb; and that not wantonly or for once, but in a regular Quantity, and enough for the Support of the young Creature many Months.

Wonderful as all theſe Accounts may appear to thoſe not uſed to conſider Things in their Cauſes, there is not in Reality any Thing ſo ſtrange in them, when the Matter is fully weighed.

Nature has provided Breaſts and Udders, with their Teats and Nipples, for all Females, younger as well as grown up; and to the Males ſhe has given the ſame Parts, by way of Conformity in the Species, though not intended for the ſame Service.

Milk is a natural Juice, and although prepared regularly at a certain Period, yet being formed from the Nouriſhment of the Body, it may be produced at any other; and as the Nouriſhment of Men is the ſame with that of Women, there is no Reaſon why it ſhould not, if wanted, be ſupplied by one as well as the other.

We ſee in the common Courſe of Nature, that ſucking will make it continue to flow when it otherwiſe would have dried up; and there is not much more wonder that the ſame Force ſhould bring it to a Place naturally deſtined for it, even at a Time when it would not otherwiſe have come.

This Method of reaſoning, plain and familiar as it is, will very well explain the Breaſts of Virgins affording Milk on being ſucked; and we ſhall not, upon a like rational Enquiry, find it any Thing more ſtrange, that the ſame Force ſhould bring it into the Breaſts of the other Sex, whether in Human or Brute Creatures.

We ſee in Men the Texture of the Breaſts is not very unlike that of Womens, and the Nipples are of the ſame Structure entirely. We have no Reaſon to ſuppoſe the Reſemblance ſtops here. Indeed Anatomy ſhews that it does not, and therefore as the Parts are of the ſame Structure, and there is the ſame Nouriſhment for the Purpoſe, it is not ſtrange that ſucking ſhould produce it.

The moſt plain Reader may underſtand theſe Reaſonings; and ſo it is throughout all Nature: hard Words are only Cloaks for Ignorance. We believe it will from this appear, that far from diſcrediting the Stories, they have heard or read of Milk in Virgins, and Milk in Male Creatures, our impartial Readers will join with us in Opinion, that the Wonder is rather that ſuch Things are not more common.

It is not ſtraining the Point too far to ſay, that

that probably any Virgin grown near Maturity, or any Man in Health, would give Milk if ſucked ſome time for it; and the ſame is doubtleſs equally true of Animals of other Kinds.

This ſeems to be a Proviſion of Nature, careful of all her Productions, as a laſt Reſource in caſe of extream Neceſſity for the tender and defenceleſs Young of Animals, which from Accidents would otherwiſe be loſt.

CHAP. II.

Of the Nature of Milk.

MILK is very much of the Nature of what is called Chyle, that is, the nutritious Juice ſeparated from our Food, and intended for the Support and Nouriſhment of our Bodies. All our Foods tend to the Formation of Chyle, and the great Purpoſe of Nature in their Digeſtion is the furniſhing of a ſufficient Supply of it; for on this Reſtoration and Preſervation of the Fabrick depend.

Chyle is a thin white Juice, conſiſting of the fineſt and moſt nouriſhing Part of our Food; and Milk is properly ſpeaking, nothing more than a thicker and richer Chyle: when the two are compared together, there is found no other Difference between them; therefore we may very reaſonably conclude, that Milk not only is made of Chyle, but that it is made by a very natural and eaſy Procedure; for there ſeems nothing more to have been done than this, that a Quantity of Chyle has been brought into the Glands of the Breaſts, and there ſome of its watery Parts have been ſeparated from it; and the Remainder becoming richer by that Means, has been left there ready to be drawn by the Mouth of the Young, or otherwiſe, in the Form of what we call Milk.

It is not ſtrange that Milk ſhould be thus made by depriving a nouriſhing Juice of ſome of its watery Parts; for upon Examination by Glaſſes, we find that it ſtill conſiſts of only a ſmall Part of real and rich Nouriſhment, mixed with a larger Quantity of a watery Fluid; and what we thus diſcover by Glaſſes, the Progreſs of Nature when Milk is left to itſelf to ſpoil, or when it is managed uſefully in the Dairy alſo confirms; for whether Milk become unmixed, as we may ſay by the Courſe of Nature, or by Management for uſeful Purpoſes, ſtill the ſame Thing is found; namely, a ſmaller Quantity of rich Matter, and a much larger of a watery Fluid.

When Milk is viewed with powerful Glaſſes, it does not look an uniform white Liquor, as it appears to the naked Eye, but is diſcovered to conſiſt of two different Matters; the one white and rich which is kept ſeparate in round Drops, and the other thin and watery: this laſt is the more large Quantity, and the other Drops ſwim in it.

In the ſame Manner when we make Butter and Cheeſe, we force a Separation of thoſe Parts, which we could not ſee to be diſtinct and different in the Milk, though this common Operation ſhews they were ſo: the rich Part makes the Butter and Cheeſe, and the other runs off poor and watery in the Butter Milk and the Whey.

This is a Proof of the Truth of what Mr. LEWENHOECK firſt declared he ſaw by Glaſſes, and it is thus that the common Operations of our Lives illuſtrate the Truths of Philoſophy; while Philoſophy ſhews us the Principles on which they are founded, and will therefore be uſeful to improve them.

The old Phyſicians thought the Milk in the Breaſts and Udders of Animals was formed from the Blood, but that led them into great Difficulties: Nature does not go to work by ſuch round-about Ways; the Proceſs by which Milk was formed, might then well appear difficult to be comprehended; but upon the preſent Plan it is very eaſy. Milk is firſt of all conveyed to the Breaſts in form of Chyle; that is, very nearly in its own proper Form; and as to the Change it undergoes in being ſeparated from ſome of its watery Mixture, 'tis no more laborious, intricate, or difficult, than that of the Separation of Urine through the Kidneys; nothing more is done than the throwing off a watery Part.

CHAP. III.

Of the ſeveral Kinds of Milk.

THE Reader has ſeen that Milk is only a richer Kind of Chyle: he has been informed how it is prepared, and in general of its Nature: to come a little cloſer to that Point, we are to examine it farther.

We have ſeen that it is compoſed of more rich and ſolid, and more fluid and watery Parts; but although the Aſſiſtance of Glaſſes could inform us no farther concerning this Matter, the Operations of the Dairy do.

Philoſophy ſhews us, from its Aſſiſtant Microſcopes, only two Parts in Milk, but Experience diſcovers three.

Milk is found by the Operations of the Dairy, to conſiſt of theſe three Parts; the Buttery, the Cheeſy, and the Wheyey.

The Buttery Parts are thoſe which being of an oily Texture, ſeparate moſt eaſily, and get to the Top. This is found agreeable to all we know in Nature: we find Butter to be of the Nature of Oil, and we know Oil will ſwim upon Water. Therefore we find that theſe three ſeparate Parts of which Milk is compoſed, are of three different Qualities; and by firſt underſtanding them, we ſhall eaſily comprehend all the Operations by which it is ſuited to our various Uſes.

Theſe three Parts are, 1. The oily; 2. The curdy; and, 3. The watery. The oily are, as we have ſeen, the Buttery Parts; the curdy are the Cheeſy, and the watery are the Wheyey.

Nothing but the Force of Nature in the Body of the Animal, could work and blend theſe perfectly into one rich and nouriſhing Fluid, fit for the tender Stomach of the Young. We find they are ſo mixed there; and that they continue mixed in that Manner for ſome Time, after

the Milk is out of the Body; but when they have once ſeparated, either naturally or by Art, we ſhall never be able to mix them ſo again. Butter, Cheeſe, and Whey were all contained in the Milk, and Nature united them in that Manner; but all our Chymiſtry will never be able to mix Butter, Cheeſe, and Whey, into Milk again.

Thus far we have ſpoken of Milk in general, as Milk, not as the Milk of any particular Kind of Creature; but having ſhewn what the Fluid itſelf is, we ſhall now ſpeak of its Differences according to the Creature from which it is obtained.

We ſhall in this Place, remembering that we write for Uſe, not Curioſity; and for the Uſe of the Farmer in particular; avoid all thoſe Things that might be ſaid concerning the Milk of the Human Breaſt, and that of ſuch other Creatures as do not fall under his Conſideration.

We ſhall conſider only the Milk of his Stock, as it may be profitable or ſerviceable to him in its ſeveral States, plain, or made into thoſe artificial Products we have already named.

Milk differs extreamly in various Creatures, according to their Diet, their Conſtruction of Body, and the particular Structure of thoſe Parts in which it is formed.

The firſt and great End of Nature in the Production of Milk, we have ſhewn was for the Nouriſhment of the Young; ſhe knows, or to uſe more proper Words, God whoſe immediate and regular Care in the Guidance of the World, is what we call Nature, knows beſt the Structure of thoſe young and tender Bodies he forms; and he has accordingly provided in the Breaſts and Udders of their Dams, a Nouriſhment ſuited to them.

Thus in all Creatures, Milk is, as we have ſhewn, the Chyle or nutritive Juice of the Parent's Body, formed into that Condition by the Separation of its watery Parts; but in ſome Creatures, more of thoſe watery Parts are ſeparated, and in others fewer, according to the Structure of thoſe Veſſels; and it muſt be according to what we ſee of their Food, that in ſome the Chyle comes more watery to thoſe Glands that ſeparate it, than it does in others: why otherwiſe ſhould it be, that the Milk of the Cow ſhould be ſo rich, and that of the Aſs ſo poor, when both eat the Graſs of the ſame Paſture.

Let not any be ſurprized at the calling Aſſes Milk poor in compariſon of Cows, from an Opinion that it muſt be richer becauſe of the Uſe Phyſicians make of it to reſtore decayed Conſtitutions: 'tis becauſe it is poorer they prefer it, for the Stomach in thoſe Perſons is not able to bear the richer Milk of the Cow.

According therefore to what we ſee in Nature, it is plain that the different Conſtruction of Body, and different Fabrick of the Veſſels formed for ſeparating and preparing Milk, occaſion that Liquor to be richer in ſome and poorer in others. This is all the real Difference between the Milk of one Creature and that of another: having premiſed this, we ſhall proceed to conſider ſeparately, thoſe ſeveral Kinds that any Way come under the Farmer's Conſideration.

Theſe are principally four; the Cows, the Aſſes, the Goats, and the Sheep: a fifth might be added, for the Milk of the Mare is uſed in ſome Places; but the firſt named Kind is the great and principal Concern of the Farmer, and the Support of the Dairy.

Nothing can be more rational than the giving ſuch Milk as Aſſes, and any other Kind that can be borne upon the Stomach as a Reſtorative: For we have ſhewn already, that Milk is only Chyle under a particular Form, therefore when the Stomach will bear it, it is Nouriſhment ready formed, and fit for immediately mixing with the Blood, to anſwer all the Purpoſes of Life.

This is properly a Method of reſtoring Nature: it is coming in to her Aſſiſtance when ſhe is not able to furniſh Nouriſhment, by bringing her that of ſome other Animal ready formed, to ſupply the Place.

As to the Preference of Aſſes Milk above that of the Cow, in the Relief of Human Kind, the Reaſon is ſhewn in Nature. Let the Milk of our own Species be compared with that of a Cow, and that of an Aſs; and the Aſſes Milk will be found to reſemble it much more than the other.

As it is commonly the Misfortune of Perſons afflicted with ſuch Diſorders as require the Aſſiſtance of Milk, to have ſuch ſharp Juices on their Stomach, as turn it to Curd; the Remedy is to ſweeten or take off the Sharpneſs of thoſe Juices: Phyſicians preſcribe various Things for that Purpoſe, but there is nothing equal to Chalk ground to a very fine Powder, and given in a little of the Milk.

Theſe ſeveral Kinds of Milk, and their Value and Uſes, ſo far as they concern the Farmer, we ſhall conſider in their proper Order, beginning with that which many Times exceeds them all in Value.

CHAP. IV.

Of Cows Milk, and its general Differences.

COWS Milk is in general by much the richeſt of all the Kinds we know, and the moſt profitable: its ſeveral Products in Butter and Cheeſe, being like its natural Condition as Milk, preferable to thoſe of all others, not only in Quality, but in Quantity: two Articles which when they concur, as they do perfectly in this Inſtance, conſtitute the higheſt Uſe and Value to the Owner.

The Milk of the Cow is ſuppoſed to vary according to the Colour of the Skin, but this is an idle Obſervation. There is an old Saying among the Farmers, that red Cows give the beſt Milk; and another, that black Cows bring the fineſt Calves: but we can from fair Trial, and repeated Experience, aſſure our Reader that there is not the leaſt Truth in either of theſe Maxims: he is to look upon them as old Wifes Tales, and no otherwiſe. We have ſeen

as much and as good Milk from black Cows, as ever was produced from red; and we may call all SMITHFIELD to witneſs, that the Value of the Calf is not in the leaſt dependent upon the Colour of the Cow.

We ſhall inform the Farmer what is the real Difference in Cattle that concerns their Milk, and he will ſee in the Courſe of that Enquiry, what has been the Origin of this idle Opinion.

He may remember that in a former Part of this Work, we have delivered him Rules for the Choice of his Cattle for their ſeveral Purpoſes; in this there is no particular Rule, for the Cow that will, when ſhe is no longer fit for the Dairy, be beſt for the Butcher; will, for the ſame Reaſon, be beſt for the Service of the Dairy alſo, while of a proper Age.

Thus, in general, the Cow to be choſen for the Dairy ſhould be large, big bon'd yet well ſhaped, and of the biggeſt Breed. This was always the Choice of the Cow, and this ſuits her as well for the Shambles as the Pail: when the Breeds of Cattle were kept more entire, WILTSHIRE was the Place from whence this large Kind principally came, and the Breed there was uſually red: from hence it became uſual to call the WILTSHIRE Breed, the red Breed; and thence inſtead of ſaying the WILTSHIRE Cow gave the beſt Milk, People uſed to ſay the red Cow gave the beſt; thoſe two Words ſignifying at that Time the very ſame Thing.

An Error or Confuſion of ſpeaking exactly of the ſame Kind, gave Origin to the vulgar Notion of the black Cow bringing the beſt Calf. The LANCASHIRE Breed were famous for their Calves; and they were generally black: thus a black Cow, and a LANCASHIRE Cow, became two Expreſſions for the ſame Thing, in the ſame Manner, as we have ſhewn a red Cow, and a WILTSHIRE Cow meant the ſame; and thus it was that when they meant to ſay, the LANCASHIRE Cow was the beſt for a Calf, they named the Colour, and not the Place, and ſaid a black Cow.

This has in each Caſe been the Occaſion of a vulgar Error, and there is no more Truth at preſent in the Preference of the red Cows Milk, than in any the idleſt common Saying.

While the Breeds of Kine were kept diſtinct, there was ſome Meaning in it; though in Reference to the Colour, it was only accidental; but now the Breeds are ſo mixed and confounded by introducing one among another, that nothing certain is to be deduced from the whole Matter.

There is another Article which does in Reality make an Alteration in the Milk of Cows, and that is the Paſturage, and Manner of feeding; but this we have, in general, conſidered already. The Reader will find it in our Diſcourſe on the Cow Kind, to which we refer him to avoid Repetition.

CHAP. V.

Of the chuſing a Milch Cow.

WE have in the before mentioned Place, given at large the Marks of Cattle, which are beſt in their ſeveral Kinds; but in this Place we ſhall add for the Service of the Dairy, ſuch Particulars as are of immediate Reference thereto, only mentioning in few Words ſo much of thoſe general Directions as are needful to be remembered therewith.

Having fixed upon a Cow that is large and well ſhaped, let the Houſewife examine whether ſhe be gentle and kindly. This may ſeem trifling, but it is much otherwiſe. There are in theſe Creatures Differences of Diſpoſition, as well as among ourſelves, and it is in vain to think they can be altered; Perverſeneſſes of this Kind are very difficultly conquered in us that have Reaſon, and it is not to be expected they can with Eaſe in ſuch Brute Creatures as want it.

The Cow being a Creature that muſt be always about the Houſe, her Gentleneſs is a very eſſential Point; and if ſhe be of a very unruly Diſpoſition, often it will reduce half her Value.

The principal Marks by which a Cow may be judged to be formed for Plenty of Milk, are a large and handſome Udder, with a proper Number of Teats, which is four, with no additional or ill ſhaped ones; but theſe four all long, thick, and ſmall at the Ends.

After the Udder let the Neck be examined, this ſhould be thin, and ſhould have a large and hairy Dewlap.

The Horns are by many ſuppoſed to denote a large Quantity of Milk when they are ſhort and crumpled, nor is this Mark to be utterly neglected. The Horns have no real Connection with the Udder, ſo that a Plenty of Milk does not depend upon them; but the beſt Dutch and Alderney Cows have theſe ſhort and crumpled Horns, and they are ſuperior to any other for the Service of the Dairy. The Horn being an eſſential Mark of the Breed in theſe, may therefore be conſidered as a Mark of Plenty of Milk.

When ſeveral Cows are to be purchaſed for the Dairy, it is very material to have them all of the ſame Kind or Breed as nearly as may be, and to take Care the Bull or Bulls, according to the Number, be of the ſame Breed alſo.

We have before obſerved, that the Breeds are at this Time ſadly mixed and confounded in ENGLAND; but as the Number cannot be had entirely of one particular Breed, let them be as near as poſſible of the ſame Make, Size, and Shape, according to the Rules we have laid down: and we muſt here repeat the Obſervation, that the Colour is of no Conſequence: let not the Farmer trouble himſelf to have red Cows for ſerving the Dairy, and black Cows for calving: this will confound the Breed, the red will ſerve for both Purpoſes equally, if their Shape be proper, and ſo will the black; therefore let his whole Care be employed, as we have named already, to have them all good, and all like one another; by this Means they will herd the more kindly together, and he will have a Breed of his own better than what he at firſt purchaſed.

We have one Thing yet to mention, with reſpect to the Choice of a Cow for the Dairy, which is very often in the Houſewife's Mouth,

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and ſhould be always in her Mind in the Purchaſe. This is what they expreſs by a particular Term, calling it Depth of Milk. By this they mean the Quantity the Cow does, or is like to furniſh: and there are Ways of judging of this, without much Danger of Error.

The Time when a Cow gives the largeſt Quantity of Milk is, when ſhe has newly calved, therefore let the Produce be well examined at that Time; for if it be deficient then, the Owner may be ſure it will never be better.

There are Cows that have more, and others that have leſs Milk; or according to their Expreſſion, Cows that are deeper in Milk, and Cows that have leſs Depth of it, without any viſible Reaſon for it; therefore in this, only Experience can guide.

We have given the Rule, and the Time of judging; and we ſhall proceed to adviſe the Owner to keep or diſpoſe of his Cows accordingly: ſo that by Degrees he will thus exchange or ſell, and purchaſe again, till he have at length not a Cow in his Yard but yields as much as a Cow well can.

This is an eſſential Point, for if the Difference in a ſingle Cow be ſomething, as it certainly is; 'tis very great in the Produce of a Number; and this is a Certainty that the Quantity of Milk does not depend upon the Quantity of Food, though the Quality of it often does upon the Nature of the Food.

A Cow that is ſtarved will not yield much, that ſtands to Reaſon; but if a Couple of Cows be watched, one of which is deep in Milk and the other not, ſhe that is the leaſt profitable, will be found to conſume as much Provender, let it be of what Kind it will, as the other.

CHAP. VI.

Of the Quantity of Milk yielded by each Cow.

THE Reader has juſt ſeen that there is a great deal of Difference in the Produce of Cows for the Dairy, when no particular Cauſe can be aſſigned; and there is alſo great Variation in reſpect of the Age, Time, Breed, and Size of the Cow, ſo that it is not only difficult but impoſſible to fix any Standard or Meaſure of the Quantity a Cow ſhould, may, or ought to yield: yet that the Owner may form ſome gueſs whether his Dairy be ſupplied moderately, poorly, or very well, we ſhall give ſome general Calculations of what may be expected. This is all that can be done in ſuch Caſes; and this, though not capable of being brought to Exactneſs or Certainty, yet is of great Uſe.

Not only the Nature and particular Conſtitution of the Cow, will make a great deal of Difference in reſpect of the Quantity of Milk; but the Time of her calving, and the particular Circumſtances relating thereto. Theſe vary ſo much in different Cows, that they prevent the Certainty of that Rule which we have in general laid down for judging of the Depth of Milk, from the Quantity yielded juſt after calving; and theſe Particularities are to be weighed and conſidered: let not the Farmer therefore think the leſs of that Rule becauſe there may be an Exception to it, from the particular Conſtitution of the Cow; but remember that all general Rules admit ſome Exceptions; and let him judge, both in reſpect of what has been ſaid, and of what we are about to ſay accordingly.

Let him obſerve what Milk his Cow yields ſoon after calving, whether it be more or leſs, and mark her down accordingly; but though he ſet down that which yields a great deal at this Time for Keeping, and that which yields but little for Sale; yet let him continue both in his Yard through the Year, and examine them as they go on.

Often a Cow that gives a great deal at firſt, ſoon falls off in that Reſpect, and yields leſs than another; and there is this farther Difference, that ſome go dry a Month, two Months, and ſome three Months, before they calve again, whereas others will yield their Quantity to the laſt. I have known them do it even the Night before their calving. This therefore is to be conſidered; for the ſame Cow that is deep in Milk once, will continue ſo; and in the ſame Manner, ſhe that one Year gives little, will not be eaſily made to yield more another.

It often happens that one of thoſe which yield a great Quantity when they have firſt calved, will grow dry ten Weeks or three Months before calving again; and on the other hand, that one which yields moderately at firſt, will continue it till the very Day of her next calveing.

Now when a Cow yields but little at firſt, ſhe can never be worth keeping for the Dairy, and therefore ſhould be diſpoſed off at once, and her Place in the Yard ſupplied by one more profitable; but a Cow that yields moderately, though not greatly, and continues it the Year round, may be worth more to her Owner than one of thoſe that yield a great deal at firſt, and grow dry for ſeveral Weeks. This muſt be carefully regarded; for the Value or Preference of one of thoſe Cows over the other, cannot be made without a Computation of the whole Produce for that Length of Time.

While this Obſervation gives the Farmer a Caution not to be too haſty in judging of the Value of his Cows, it at the ſame Time ſets in a clearer Light, the uncertainty and difficulty we have before named, of making any Computation ſtrictly of the Quantity to be expected from a ſingle Cow; we ſhall, however, ſpeak as we propoſed in general to that Point.

A great deal depends as to the Quantity of Milk upon the Time the Cow is to calve; and as this makes ſo great an Alteration in the annual Produce, we cannot ſtate the Account without it.

The beſt and moſt favourable Time for the Cow to calve, in order to her yielding the greateſt Plenty of Milk is, when the Paſturage is ſpringing in all its Strength, for then it will make the greateſt Supply. Therefore thoſe who wiſh for Abundance of Milk, are very happy if their Calves fall in the End of March, or the

Beginning of April, for at that Seaſon the Graſs is in its fulleſt ſpringing Strength. The Calves at this Time indeed are not profitable for rearing, becauſe they muſt be fed upon the Cow's beſt Milk, which is not the Caſe of thoſe that fall latter; but an early Cow, the Calf being conſidered as to be ſold to the Butcher as ſoon as may be, is vaſtly preferable in Point of the Abundance of Milk, to one that falls later.

To ſpeak of the Milk in its moſt favourable Time for Quantity, and under the moſt favourable Circumſtances, we will compute that of a new milch Cow firſt turned to Graſs in April. The Produce of ſuch a Cow at ſuch a Time, according to the different Accidents we have named, may be computed between five Quarts and twelve at a milking; and many of theſe Accidents have Cauſes ſo beyond our Reach to know, that it is often impoſſible to gueſs any thing about the Difference before hand. Three Gallons, Winchester Meaſure, at a Time, is a very great and rich Produce; two Gallons is a very fine Quantity: a Cow that gives five Quarts at a milking, which we have ſet at the loweſt worth keeping, is a very good one, if ſhe will continue it the whole Year round; ſo that ſhe is worth trying; but the Cow that yields leſs than a Gallon is utterly to be rejected, and her Place ſupplied by another. In general, the Cow may be ſaid to yield very well that gives a Gallon and half at a Time, if there be a proper Continuance of that Quantity. If this be properly managed it will yield a ſixth Part Cream, that is, one Quart of good rich Cream for every Time of milking each Cow; and this will yield very well a Pound of Butter.

This is the Computation the Farmer ought to receive as a Medium, he may reſt ſatisfied with a Cow that gives leſs, and he may have one that yields much more, not a great deal to his Advantage; becauſe thoſe great Yielders, as we have obſerved before, do not hold out like thoſe which begin, as the Expreſſion is, fair and ſoftly.

It will not be difficult, from this moderate Eſtimate, to compute what the induſtrious and careful Houſewife will make of a good Number of Cows, the Produce is eaſy from one to many, when the common Quantity is known.

CHAP. VII.

Of the Times of milking.

THE two great Points upon which the Profit of a Dairy depends are the Hours of milking, and the proper ordering of the Milk when it is brought into the Houſe. The firſt may ſeem to many a ſmall Concern in Compariſon of the other, but thoſe who have had Experience for their Guide know 'tis of great Importance.

A Cow ſhould be milked always twice in the four and twenty Hours: there are thoſe who approve of three Times, but to ſpeak from Experience I muſt have Leave to ſay, that it is Trouble employed to Loſs; for upon Trial I have found that the Quantity of Milk obtained at twice milking at twelve Hours Diſtance, has been more than that got by three Times milking at ſix Hours Diſtance in the Day, and leaving the Night for Reſt entirely.

This laſt Practice, however recommended by ſome who have written well on theſe Matters, and however approved by ſome who think themſelves good Houſewives, proves on Trial to be faulty and erroneous: 'tis only a teazing of Nature: 'tis expecting what cannot be performed, for a Supply worth taking, or needful to be taken, cannot be made in leſs than twelve Hours; and beſide, Nature loves Regularity; and in our Way of two milkings in the four and twenty Hours, each may be at twelve Hours Diſtance; whereas in the other, the common Way is to have two Intervals of only ſix Hours each, and one of twelve.

Thoſe who underſtand the Conduct of Nature in the Bodies of Animals, know that there is not this Difference to be made between the Hours of eating and of reſt; for though the Creature eat only in the Day, the Work of Digeſtion goes on all Night, and therefore the Times of milking ought to be at regular Diſtances: this alſo is ſhewn by Experience, becauſe we find a Cow with an Udder full in the Morning after ſleeping, as well as in the Evening after the whole Day's feeding.

There are Cows that it is ſaid require three Times milking in the four and twenty Hours, becauſe otherwiſe they will ſhed their Milk: this would ſeem an Objection to what I have endeavoured to eſtabliſh as a Rule; but from all that I have ſeen, this Neceſſity has been owing to nothing in regular Nature, but altogether to one of theſe two Cauſes, either to a Cuſtom of doing it, or to ſome Diſtemper in the Udder, or in the Nature of the Milk.

Whatever Nature has been accuſtomed to, that ſhe expects; therefore if a Cow have been uſed to be milked thrice a Day, ſhe will require it, but the Quantity, as before obſerved, will not be at all more than if ſhe were milked only twice; as to the other Caſe, of her ſhedding the Milk if not taken at theſe Times, it is to be conſider'd as a Diſorder, being certainly no other; and certainly what a ſickly or diſtempered Creature requires, is not to be made a Rule for the Management of one that is in Health.

From this, and from all I have ſeen, and all the Obſervations I have been able to make from repeated Trials, I am convinced that two milkings in a Day is as much as any Cow in a State of Health can require; and that the greateſt Quantity of Milk is obtained under this Management.

Having eſtabliſhed twice in the four and twenty Hours, as the proper Periods of milking, the next Thing is to ſettle at what Time it ſhall be done. But this is a Thing more liable to Uncertainty than the other. In many Places there are certain ſtated Hours for the Sale of Milk, and when any conſiderable Quantity of it is intended to be diſpoſed of in that Way, the Times of milking muſt be adapted to thoſe Hours: thus in and about London, and other large Towns, there are certain Hours at the which Families

milies are uſed to take in the Milk for their Occaſions, they therefore expect it at theſe Times; and the Retailers are uſed to have it at the Hours juſt before; ſo that the profeſſed Cowkeeper, who intends this Uſe of his Milk, muſt accommodate the Times of milking accordingly.

On the other hand, the Country Farmer who keeps his Dairy for his own Uſe and Profit, and ſet the greateſt Part, or in a Manner all that his Cows yield, for Cream, may take what Times of milking he pleaſes; and then it is his Buſineſs to chuſe ſuch as are moſt natural.

In Summer, when the Days are long, the moſt natural, convenient, and advantageous Times are Morning and Evening: no Hours are ſo well as between ſix and ſeven in the Morning, and toward ſeven in the Evening. There are no Hours of the Day at which the Udders of the Cows are ſo naturally diſtended with Milk; conſequently none at which it is ſo natural, or ſo much an Eaſe to themſelves to milk them, or at which they yield ſo freely.

The Morning gives the Milk formed in the whole Night's Reſt and Digeſtion; and the Evening gives that made from the abundant Food of the Day; Part of which, from the Quantity taken in, muſt be converted into Nouriſhment at the Time; the Remainder during the Hours of Repoſe. We have, in a preceding Chapter, informed the Farmer how Milk is formed and produced, therefore this Account will be familiar to him.

As the Days lengthen toward MIDSUMMER, theſe Hours may be made a little earlier and a little later, but not much; as the Days ſhorten after MIDSUMMER they muſt of Neceſſity be changed for ſuch as are conſiderably later in the Morning, and conſiderably earlier in the Afternoon.

As to the third Time of milking, thoſe over-induſtrious Perſons who approve of it, generally make it ſix Hours after the Morning milking, which places it ſix Hours before the Evening Time in Summer, and makes it about the Middle of the Day. We have already ſhewn that it is prejudicial to the Creatures, and of no Advantage to the Farmer; and we may add, that as it requires more Trouble and Attendance of Servants, it neceſſarily brings on more Expence, which is another Diſadvantage.

From what I have ſeen of the milking Cows three Times a Day, I think I have Reaſon to imagine that it makes them dry up the ſooner. I had been led to believe at one Time, that it would be a Way to keep them in Milk the Year round, and made Trials in my own Stock, carefully minuting down the Obſervations, which I expected would have ſhewn this, but the Effect was exactly the contrary: ſo that ſeeing the Matter in all its poſſible Lights, this third milking is a diſadvantageous Practice.

I have met with ſome Farmers who have been ſtrongly of Opinion, that the Cow's keeping in Milk to the Time of her calving again, was not to their Advantage; for that the Milk being drawn away all that Time weakened the Calf. This is another of thoſe ſpecious Reaſonings which nothing ſets aſide but Experience. I have examined and obſerved this Difference in reſpect of the Calves, not once or twice, but many repeated Times, and can aſſure the Farmer, from what I have thus ſeen, that a Cow's yielding Milk to the very Time of her coming again, is no Diſadvantage at all to the Calf that is to come, but rather a Help. From theſe Obſervations what I have learned is this, that a Calf in the Body of the Cow is much more likely to have too much Nouriſhment than too little; and that for one which comes into the World poor and ſtarved, twenty come full of groſs Humours. At the ſame Time it is to be obſerved, that want of Nouriſhment is a Fault ſoon mended, for the Milk is rich and abundant, ſo that rarely any Harm happens from this; whereas the bringing into the World with them an Abundance of Humours and a Groſſneſs of Habit, is commonly their Deſtruction.

Therefore it appears on all Hands, and from a Compariſon of all Things together, that it is greatly to the Advantage of the Farmer, that his Cows ſhould go the Year round with Milk, and conſequently that it becomes his Intereſt to watch and obſerve them the whole Time; for that a Cow that yields but moderately, and continues it without any Interruption, is better for him in every Reſpect than one that yields an Abundance at firſt, and grows dry afterwards. This is not the common Opinion, for that is on the contrary Side, but the Truth lies wholly here; and therefore the Experience is the more uſeful.

CHAP. VIII.

Of the Manner of milking.

THIS may ſeem a Conſideration too trivial to have a Place in ſuch a Work as ours, but we ſhall not therefore neglect it: nothing is trivial that may prove of Conſequence; and it is to this ſingle Vanity of over-looking Things of Importance, under the Name of frivolous and unworthy Conſideration, that the greateſt Part of the Writings on this Subject are wholly uſeleſs.

The Operation of milking indeed is very trivial and very eaſy; but as eaſy as it is 'tis not enough underſtood. It is entruſted to Perſons who have little Senſe or Conſideration, and who learn it they don't know how; nor does the Owner ever concern himſelf whether they do it well or ill.

There is a great deal of Difference between handling the Teats gently and roughly; and ſome Knowledge is required to tell how the Milk ſhall be got with moſt Eaſe to the Creature.

Milking, when carefully performed, is an Eaſe and Pleaſure to the Cow; but it may be ſo managed, and it too often is, that 'tis a Pain and Torment to her.

We have obſerved that there are Cows naturally ill-conditioned, but theſe are not common; the greater Part of the Accidents that happen in this Way, and are laid to the Fault of the Cow, are owing to the rough and ill Conduct of the Perſons employed to milk her.

The Farmer alſo is not unfrequently diſtreſſed by the Diſorders of the Cow's Teats, and the Hedgehog at this Time is blamed, as the Fairy uſed to be accuſed formerly of being the Occaſion of thoſe Diſorders; but in general, the Urchine is as innocent as the Spirit; and the Diſorders are owing to Hurts in the handling of the Teats.

Having thus repreſented to the Farmer the Miſchiefs that ariſe from an unſkilful Way of milking, and the Neceſſity of its being performed in a better Manner; we hope he will not accuſe us according to the vulgar Cuſtom, of deſcending too low in the taking it under Conſideration, nor neglect the practical Directions we ſhall give upon the Subject. His knowing what is proper to be done is the moſt important Conſideration of all, for he will be able to ſay what is right and what wrong; to inſtruct the ignorant, and to over-look the opinionated: now and then giving an Eye to the Matter himſelf, and giving his Inſtructions where they are wanted, and Reproofs, where they are deſerved, will ſet all right, and occaſion his Buſineſs to be conducted in this Point much more to his Satisfaction and Intereſt than he could otherwiſe expect.

When the Milker goes to her Work ſhe muſt take the near Side of the Cow, and begin by gently handling and ſtroaking down the Teats; and from time to time ſhe muſt moiſten them with Milk, to make them ſupple and pliable; and by this Practice they will be brought to anſwer to her Touch much better, and will yield the Milk more readily and freely, and that without any Pain to the Creature; indeed on the contrary with Pleaſure.

There is palpably all this Difference in the Manner of milking. The Quantity in the Udder is a Burthen and great Weight to the Cow, and ſhe wiſhes earneſtly to be relieved from it; but if that be done with Harſhneſs, ſo as to occaſion more Pain for the Time than the Load of Milk, then ſhe will avoid it: on the other hand, if ſhe be milked kindly and gently, beginning as we have directed, not only the eaſing her of the Load is a Relief, but the very Manner of doing it is a Pleaſure. Every Mother who has given Suck knows there is a Pleaſure in performing that Office to the Infant, independent of any Thought of the Mind: this Pleaſure is in the Nipple itſelf, and this the whole Creation of Female Creatures that give Suck have; and it is the ſame in milking as in ſucking.

To this rude Method of handling the Teats is owing, as we have ſaid, a great deal of the ill Diſpoſition of ſome Cows; and to the kind and gentle Treatment others receive it is owing that they are kind and gentle themſelves. A Cow that is well fed will have her Udder full at certain Times, and when ſhe knows ſhe can be relieved from that Load without Pain, ſhe will come of herſelf to the Pail, and will ſtand with all poſſible Satisfaction.

We have ſaid in what Manner the Milkmaid is to begin her Work, and ſhall add how ſhe is to continue. She muſt not fix herſelf, nor ſet her Pail firm to the Ground, till ſhe has got the Cow to ſtand ſure and quiet: theſe Creatures are often very reſtleſs in the Beginning, but they will ſtand ſtill enough when the Milk has come for a little while freely. This muſt be watched, becauſe the Milk that is got will be otherwiſe in Danger. The Cow is a heavy Creature, and a little Kick of her Foot will bring the Pail down.

When ſhe is once ſettled, and the Milkmaid is ſeated, and all goes on for ſome Minutes right, there is leſs Danger, but ſtill the Woman muſt be always upon her Guard, a Cow may ſtart at any Time, and ſhe muſt have her Eye upon all her Motions, and her Hand upon the Pail, ready to remove it upon Occaſion, otherwiſe the overturning of a Pail is very eaſy, and the Milk may be all loſt in a Moment, that this careful Eye might have ſaved.

When the Cow is quiet and ſeems pleaſed with the milking, then let the Woman go on boldly; that which would have pained the Creature cruelly at firſt, will not hurt her at all now, that the Teats have been handled, moiſtened, and rendered ſupple; let her therefore now pull and ſtrain them freely, and draw as long as any Milk will come.

This laſt Article muſt be treated of more largely than in thoſe few Words. The worſt Fault a Milker can be guilty of is, the not doing it clean and thoroughly. Let the Farmer or his Wife frequently ſee to this: they ſhould give all their Milkers Orders to take Care, that not a Drop of Milk be left in the Udder when they leave off; and they ſhould ſee at Times, when they are at their Work, whether thoſe Directions are punctually followed. If there were nothing but the Loſs of ſo much Milk as is left in the Udder that is but half drawn, that would be ſome Conſideration, for in a Number of Cows it would amount to what was conſiderable, and this twice a Day would, in the Year's Courſe, make a great Diminution in the Profits of the Dairy: perhaps this alone would make the Difference of four or five Cows in a Year, and the Farmer knows the Value of their keeping well enough, to be ſenſible what a Fault that would be. But there is a much greater Conſideration than this, for there is nothing that tends to keep a Cow ſo full in Milk, as the conſtantly milking her quite clean; and on the other Hand, there is no Way ſo ſure to make her ſoon dry, as the milking in a careleſs Manner, and always leaving ſome behind in the Udder.

This depends upon the Courſe of Nature in furniſhing the Udder with Milk, as we have ſhewn. While it is drained Nature gives a continual and conſtant Supply, whether that draining be done by the Mouth of the Young or the Hand of the Milkmaid; but as ſoon as no more is drawn no more is provided. This is the Caſe at large when the Young dies, or the Creature is any way left untouched; and the ſame Thing holds good, in a proportioned Degree, when ſhe is careleſsly milked, and the Udder not well drained.

When that is perfectly emptied at Times, Nature goes on vigorouſly with a Supply; but when it is done but imperfectly ſhe performs her Work languidly, and there is not that free and full

Supply

Supply any longer. The Farmer knows the Importance of keeping his Cows deep in Milk, and a long Time in it; and it is fit he ſhould perfectly know, and thoroughly conſider how much that important Article depends upon the Milk-maid's doing her Duty.

Another Caution to be given to all Milkers is, that they make themſelves as familiar and friendly with the Cows as poſſible. By Gentleneſs and kind Treatment they will come to know them, and will go to the Pail like rational Creatures. While they are milking common Diſcretion will teach the Perſon not to do any thing to ſtartle or frighten them; and it is a good Caution alſo to let them go quietly and eaſily away. I have ſeen many drive their Cows away haſtily and roughly, as ſoon as they had done, as if they never were to have any thing to do with them again. All Creatures have Memory: the Cow does not forget this; and it is that makes her ſhy or troubleſome the next Time: let them always be treated tenderly, and let them go peaceably as they come: there is no other Way to have them come peaceably again.

CHAP. IX.

Of ordering the Milk in the Dairy.

THE Farmer has ſeen every Article neceſſary to be done in the obtaining his Milk from the Cow, let him now take Care of it when he has got it: he has taken the proper Meaſures for having the beſt Cows; for getting the moſt from them; for keeping them long to it; and for avoiding Miſchief in the drawing it; we will ſuppoſe it therefore in the Pails, and bringing Home; and that he is deſirous to make the Dairy fit to receive it in the beſt Manner.

The firſt Thing, and the moſt important of all in a Dairy, is Cleanlineſs. Not only all the Veſſels and Utenſils, but the very Floor, Walls, and Cieling; every thing that is in it, and every thing that is about it, muſt be thus managed with the utmoſt Nicety of Cleanneſs, or there will be continual Damage and Loſs.

The great Article in a Dairy is to keep all ſweet; and there is no Way to keep Things ſweet like keeping them perfectly clean: this Reaſon dictates, and this Experience confirms.

The Dread that ſhould always be uppermoſt in a Dairy is of Sowerneſs: and to keep Things from ſowering the Receipt is the ſame; that is, keep them clean.

Milk will at the beſt keep but a little while. All the Art and all the Care in the World cannot keep it long: it will become ſower, and there is the great Damage. When it has once got ſower it will ſpread the Miſchief, and this is what the Miſtreſs of the Dairy is to employ all her Care to prevent; and the far greateſt Part of that Care centers in the ſame Point Cleanlineſs.

The Foulneſs of a Dairy is uſually from corrupted Milk or Cream, and this muſt be cleaned away perfectly, for it will otherwiſe not only communicate itſelf to whatever is near it, but will infect the very Air of the Room, to the Prejudice of the whole Quantity of Milk that is brought into it, and of every thing that is going forwards. What the old Wives uſed to attribute to Witches and Fairies, was in reality the Effect of ſomething ſower left in the Dairy: this was the natural and real Cauſe, but the Effects of it are ſo great and ſo perplexing, to ſuch as do not know the Cauſe, that no Wonder they thought Witchcraft had a Hand in it.

Here then lies the firſt Article of Cleanlineſs, which is to take Care no ſpoiled Remains of a former Buſineſs hang about the Dairy, nothing ſower remain in any Crack or Crevice; for this End all the Pails, Pans, and Veſſels, muſt be daily perfectly cleaned; and for this Reaſon glazed Earthen Ware is preferable to any other Materials for them, becauſe nothing ſticks to it, there are no Crevices in it, and one may always ſee whether it be clean.

Thoſe who are at all acquainted with the Buſineſs of a Dairy, know how nice and tickliſh all the Works of it are; therefore let them take Care not to add to the Hazard or Perplexity by Foulneſs. We have mentioned the Remains of any thing ſower as the firſt Article, becauſe that is a Miſchief that ſpreads ſo quick and ſo far, but we are alſo to caution the Houſewife againſt Greaſe, Dirt, or Filth of any Kind whatſoever; for every thing that does not belong to the Work of the Dairy hinders it.

There is no Way to clean and ſweeten the Veſſels, but by ſcalding them with boiling Water, and then ſetting them out in the Air: the firſt cleanſes off all Filth that is viſible to the Eye, and the latter removes any Taint by purifying and evaporating any thing that remained about them. There is nothing equal to the Sun, Wind, and Air, for purifying Things after proper cleaning, and this Practice ſhould be uſed in the Dairy every Day, whether the Things appear dirty or no; there may be Filth about them that is not ſeen, and the leaſt of it will do Miſchief.

CHAP. X.

Of the Veſſels of the Dairy.

THE Uſe of the Dairy is to produce from the natural Milk, ſuch Products as the Farmer ſhall find turn beſt to his Account; and the ſeveral Veſſels employed in it all tend to that Purpoſe. Theſe we are to conſider in two Lights, with reſpect to their Form and their Materials.

As to their Form we are not ignorant of the many new Inventions that have been ſtarted for the facilitating the Operations of the Dairy; nor do we utterly adviſe the Farmer from regarding them; but this Caution we ſhall give him, that he do not rely too much upon the Words of their Inventors, or of thoſe who have ſo warmly recommended them. Theſe have been in general People of Ingenuity, but of no Experience. They have ſeen the Conveniences that might attend ſomething of the Nature of what they propoſed, but they have not perceived what might be the In-

Inconveniences of their own particular Inventions, therefore the Farmer, or practical Dairyman, is to try before he approves: he is obliged to thoſe Gentlemen for the Hint, but he is to determine for himſelf, for he can do it much better than they, whether that Hint can be reduced to Practice.

Thus it is the reaſonable Huſbandman will conſider all that is offered for the Improvement of his Profeſſion, neither rejecting at Random, nor adopting without Proof. Many Things appear very feaſible in the Cloſet, that are utterly impracticable in the Field: there is therefore no other Way of judging of them than by the Help of that Experience firſt, which their ingenious Inventors wanted; and afterwards, if this Experience joins in the Opinion, then to bring them to a Trial.

'Tis thus we adviſe the Farmer to conſider the ſeveral new Improvements of a Dairy; and having given him this Hint, or if we may uſe the Expreſſion, this Rule of Practice with Reſpect to the new, we ſhall proceed to inform him in the Management of the old and accuſtomed Methods: theſe are ſure, and to confeſs a Truth diſagreeable perhaps to the Inventors of new Schemes on this Head, I have never yet found upon Trial, that any others, with all their ſpecious Promiſes, exceeded them.

As to the Materials of which the Veſſels for the Dairy ſhould be made, we have already declared for glazed Earthen Ware; but that not ſo abſolutely as to reject thoſe of all other Kinds.

People of Fortune who have amuſed themſelves with the Pleaſures of a Dairy in the Country, have covered their Walls with Dutch Tiles; and had their Veſſels of China, and this is extreamly right. As to the Veſſels, China are in this Reſpect as good for Uſe as glazed Earthen Ware, but not in the leaſt better, for they are covered in the ſame Manner with a Glazing; and ſo a Veſſel be glazed, and the Glazing whole and without Flaws, 'tis no Matter whether it were done in the EAST INDIES or at Home. There is a Difference in the Materials uſed in the Manufactures of EUROPE and the Eaſt on this Occaſion, but it is not material in this Conſideration. Our Glazing for theſe Veſſels is made of Lead, and theirs is only a kind of Earth mixed up in Water, but the Effect is the ſame. Either is a glaſſy or ſhelly Subſtance which the Milk cannot penetrate, and therefore they equally anſwer the Purpoſe.

As to the covering the Walls with Tiles it is certainly right, as it anſwers two Purpoſes, both very eſſential to a Dairy, Cleanlineſs and Coolneſs. I have ſeen a Dairy in WILTSHIRE lined throughout with Lead, and it had alſo a very good Effect. The Expence of this laſt Method will appear conſiderable at firſt, but taking in the whole Account nothing is ſo cheap. It laſts from Generation to Generation without Repairs, and it has always a very conſiderable intrinſick Value: ſo much Lead is worth ſo much Money at any Time.

The uſual Kinds of Veſſels are three, Earthen Ware glazed, Wood naked, or Wood lined with Lead. As to the firſt we have ſpoken, the ſecond is very good, but it has leſs natural Coolneſs, and is not ſo eaſily made perfectly clean as the Earthen Ware; the Lead has all the Advantage of Coolneſs, and may eaſily enough be kept clean.

The Difference is not very great, but the Reaſon will eaſily be ſeen in what we have here ſaid, why we give the Preference to the Earthen Veſſel.

Where the Dairy lies low, and is in itſelf very cool, Wooden Veſſels do better than elſewhere; and where there is a very great Buſineſs carried on, there is Convenience in Wood lined with Lead, becauſe Veſſels may thus be made of ſuch a Form and Bigneſs, as cannot be had from the Potteries. On all Occaſions the Shape of the Veſſels ſhould be broad and ſhallow: this anſwers two Purpoſes, for it makes the Milk yield the largeſt Quantity of Cream, and it keeps it the longeſt from ſowering. It is a Rule founded upon repeated Experiments, that a Quantity of Milk under the ſame Circumſtances otherwiſe, will always ſower the ſooner, the deeper it lies together in the Veſſel. Upon theſe Principles, founded on Experience, not on any fanciful Theory, ſtands the whole Matter of the preparing a Dairy for the Reception of the Milk.

CHAP. XI.

Of ſetting the Milk for Cream.

THE Dairy is now ready for the Milk, and that is coming Home in Pails upon the Shoulders of the Milkers, the Veſſels in which it is to be ſet are placed ready to receive it; but there is one thing to be conſidered previouſly to its being put into them.

We have taken Care that there be no Dirt in the Dairy, let us take the ſame Precaution that none come into it from the Field. Too much Cleanlineſs can never be recommended to the Milkmaids, but let them take what Care they will, they can never keep their Pails perfectly free from Dirt, or ſome accidental Foulneſſes. The Hairs from the Cow will fall into them, and other little Matters of the ſame Kind may alſo. Now all theſe, however they are blended among the Milk, would riſe with the Cream, and ſo not only diſgrace the Houſewife, but diſturb all the Operations that are to follow; for we have ſhewn that any the leaſt Filth will perplex and teaze the whole Management afterwards.

To prevent Accidents of this Kind the Milk is to be ſtrained; and this is to be done in a very eaſy and familiar Manner, by Means of what the Houſewife calls her Soiling Diſh, or as they commonly ſpeak it the Syle Diſh. This is a wooden Bowl, with its Bottom cut out, and the Opening covered with a Piece of fine clean Linnen Cloth.

This Bowl muſt be every Day ſcalded, and ſet out in the Air to ſweeten like the reſt, and Care muſt be taken that the Cloth be always perfectly clean. Through this Diſh the Milk is to run into the ſeveral Veſſels prepared to receive it, and then it will run perfectly clean and pure, for the hollow'd Bottom will ſtop the ſmalleſt

ſmalleſt Particle, and thus nothing but the Milk can get into the Veſſels.

Thus far then we will ſuppoſe our Houſewife has provided with perfect Care and Regularity, her Milk is perfectly pure, and is in the Veſſels perfectly clean: there is therefore no Danger of any Injury to it, and 'tis now to be left to Nature. The Dairy is cool, clean, and quiet, this is all that is needful, or can be done to promote the gathering of the Cream: properly ſpeaking nothing can be done to promote this, for it is a natural Procedure, and muſt go on in its own Way, all that can be done is to prevent Dirt, Heat, or Diſturbance; and this we have contrived already to do in the Structure of the Place.

The Milk, as we have ſhewn, is compoſed of different Parts: theſe are kept mixed while it is in the Body of the Animal, but they ſeparate one from another when they are out: this is that Separation which prepares for the Operations of the Dairy. The rich and fatty Part ſeparates from the poor and watery; that is, the Cream riſes to the Top, and leaves the thin and watery Part at Bottom. The broader and ſhallower the Veſſel is in which it is ſet, the more freely, eaſily, and readily this Separation is made; that is, the ſooner the Cream gets to the Top, and the greater Quantity there will be of it, theſe are the two great Points the Houſewife deſires; therefore ſhe will always uſe ſuch Veſſels.

CHAP. XII.

Of ſkimming the Cream.

WE are ſenſible how lightly many of theſe Things are in general looked upon, that here make the Subjects of ſo many diſtinct Chapters, but it is to that want of Conſideration of what are called Trifles, that half the Diſappointments and Loſſes in a Dairy happen. It may eaſily be ſaid that every Houſewife knows when her Cream is riſen, ſhe is to ſkim it off: that is true, we do not take up her Time in telling her that ſhe is to do it, but we are about to acquaint her how ſhe ſhall do it to the greateſt Advantage; and from what we have ſeen of Dairies in ſome Parts of this Kingdom, no Part of Information relating to the whole Farm is more neceſſary.

We have recommended Cleanlineſs in every Article relating to the Dairy, but here we are to repeat that Leſſon. There is nothing that requires more Nicety than the ſkimming off the Cream, nor any Article in which a little Dirt can do ſo much Damage.

We will ſuppoſe the Milk to have been brought in in the Morning, according to our Directions for the Summer milking, about Seven o'Clock; toward Afternoon let the Skimming Diſh be cleaned and got ready, and the Veſſels that are to receive the Cream. The Skimming Diſh ſhould be of a convenient Size for the Hand, not too deep, and thin at the Edges.

The Time that Milk ſhould ſtand is a Point in which few are agreed, and about which moſt err. I ſhall endeavour to ſet the Matter in as certain a Light as its Nature will bear: perfect Punctuality cannot be expected in any Rule on ſuch a Subject, but being in one Article eſtabliſhed, the Houſewife may vary according to her Diſcretion, as the Circumſtances vary: and it is better to have a Rule fixed for one Seaſon and Kind of Weather, than to have none fixed at all.

In Summer then I ſhall ſay ten Hours is in general enough for Milk to ſtand. Therefore this Milk having been brought in at Seven in the Morning, will be ready to ſkim at Five in the Afternoon; and this will be a very convenient Time to the Houſewife, becauſe what ſhe is now doing will prepare for the Evening Milking.

Many let their Milk ſtand longer than this in Summer, and conſequently vary according to the Circumſtances at other Times, but by what I have found from repeated Experience, there is no Rule ſo proper. 'Tis a very nice Point, and of very great Importance, either Way an Exceſs or Defect may be of great Damage; if the Milk be ſkimmed too ſoon the Houſewife has not her full Quantity; and if it ſtand too long the Butter made with it will ſuffer.

The firſt of theſe Points is plain to every one, but the latter is not ſufficiently known; or at leaſt not enough regarded. When Milk ſtands too long without ſkimming, the Cream gets a thick Head, and is untractable, and the Butter that is made of this is always bitter. I have known this in Inſtances out of Number, and when I have convinced ſome Houſewives that it was owing to this Fault of letting the Milk ſtand too long, they have tried every Method that could be thought of to prevent the Effect, but in vain: I have known them boil the Cream that was thus taken from Milk which had ſtood too long, in order to prevent this ill Taſte in the Butter, but to no Purpoſe; it has ſtill been as bitter as if nothing were done to prevent it.

What all the Pains and Care imaginable cannot remedy in this, as in many other Caſes, may eaſily be obviated, and that is the Leſſon which we give to the Houſewife. Prevent the Damage by ſkimming in Time.

We have given this Inſtance of the bad Effect of letting Milk ſtand too long, nor is it the only one by many, but it is ſo plain, and a thing ſo eaſily in every one's Power to try, that it is, we hope, ſufficient. Therefore, according to our Rule, let the Milk be all ſkimmed at Five o'Clock in the Afternoon, and let it be put into a proper Veſſel. The beſt Veſſel is an Earthen Pot well leaded, with a Cover. When it is put into this let it be ſet by in a cloſe cool Place.

The Cream is now taken off, put into the Pot, and ſet by, an Hour or more has been employed in this, and in cleaning the neceſſary Veſſels, and by that Time they are got in and ſet in order 'tis Seven o'Clock, and the Milkmaids come in loaded from the Evening's Milking. The Milk is to be ſtrained and managed exactly in the ſame Manner as the firſt, ſo there needs no particular Direction on that Head; and we ſhall therefore, to avoid Repetition, ſuppoſe the ſame Buſineſs gone through, and the Milk all ſet as the firſt.

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The Houſewife may now be quiet for the Night, but let her take Care to be up early in the Morning. The next Article to Cleanlineſs is early riſing in this Buſineſs, and it is need ſhe be up, for the Milk ſhe has ſet over Night will be ready for ſkimming after ten Hours, or half an Hour more, that is, by Five, or ſoon after Five in the Morning. In general it will be beſt to allow half an Hour longer ſtanding during the Night than in the Day, becauſe the Night is cooler; and Experience ſhews that the Warmth of the Air has a great deal of Effect in the throwing up of Cream.

In this Manner the Cream will be taken off from the Evening's Milk; and all got ready for the Reception of that of the Morning, by that Time the Milkmaids come Home with it; and thus the whole Round of that important Article, the obtaining, ſetting, and ſkimming the Milk, will be managed without the leaſt Trouble or Perplexity, and every thing go on in a quiet and regular Order.

CHAP. XIII.

Of the Managment of the Cream.

IN the Cloſe of our laſt Chapter we left our Houſewife with her Pots of Cream, and her Dairy Work going on with due Regularity, we muſt proceed to adviſe her how to manage the Produce of her Pans in the beſt and moſt ſatisfactory Manner.

In this Article there is Need of the greateſt Caution, and that for the plaineſt Reaſon in the World, which is, that Convenience would naturally preſcribe the keeping it longer than it is found in Effect ſafe or proper to do.

The Weather makes a great Variation in this Article, and we are to obſerve alſo, that there are artificial Ways of aſſiſting Nature in preſerving it. However, as pure ſweet Cream, in its natural Condition, is vaſtly preferable to the beſt that is preſerved in whatever Manner by Art, we ſhall firſt give the Houſewife her Leſſon how long ſhe ſhould, and how long ſhe may keep it naturally; and afterwards inform her what may be done in the keeping it longer by Art and Management.

The fineſt and moſt excellent Butter is that which is made from Cream that has not ſtood above ten Hours in the Summer; on the other hand, in Winter it may be kept much longer without Damage. When we name the Time of ten Hours, it is by Way of limiting the Space in which it is quite perfect; for Butter that is made from Cream ten Hours old, or from ſuch as is juſt ſkimmed is altogether the ſame. After this, in Summer it begins to find ſome Change, but it is little for the two ſucceeding Days, only in general the newer the better.

The Seaſon makes ſo great a Variation in this Matter, that Cream may be kept very well twice as long in Winter as in Summer.

In Summer it may be kept without any material Diſadvantage two Days and a half; and in Winter it may be kept in the ſame Condition five Days.

The Houſewife who intends to have Credit in her Butter, if ſhe takes Care not to let the Milk ſtand too long before it is ſkimmed, may very well keep it thus long without any particular Management; but if ſhe intends to have more of it together than can be got from her Stock of Cows in that Time, or to churn but at certain Times, which require the Cream to be kept longer, then ſhe muſt uſe ſome Art to preſerve it.

In this Place however it may be neceſſary to obſerve, that in making Butter for Sale in large Quantities, there is no Objection to the Cream being kept longer. In this Caſe it turns ſour; but the Butter is not the worſe for Market, unleſs it have been over-heated or otherwiſe ill-managed in the Churn. The fine Butter for preſent Uſe ſhould always be made of perfectly freſh Cream; but for this marketable Commodity the other is rather preferable; for Experience ſhews that Butter made otherwiſe under the ſame Advantages, keeps better when the Cream has ſtood to be ſour, than when it was ſo perfectly freſh, unleſs it turn bitter: this, in Butter made from Cream that has been kept till ſour, is always a Mark, and is always the firſt Mark of its tending to Decay; wherefore in that Caſe, the ſooner it is uſed the better.

The fine Flavour depends on the Freſhneſs of the Cream, but otherwiſe the Butter is not the worſe for ſome keeping.

Theſe are Particulars we ſhall conſider more particularly in a ſucceeding Chapter, treating of Butter, but thus much it was needful to ſay here, that the Houſewife may exactly know not only how long her Cream is to be kept, but what are the Diſadvantages of keeping it longer.

Having explained this Matter ſo far, we ſhall proceed to tell her what is to be done, when ſhe is deſirous of keeping it longer than it is poſſible for her to expect it naturally to laſt good.

The Days of Market often regulate the Days of churning: there is ſome Convenience in doing a good deal of Buſineſs in that Reſpect at once, and when there is but one Market near, and that but one Day in the Week, which in the Country in many Places is no uncommon Thing, it will be a great Convenience to the Houſewife if ſhe can contrive to churn but once in the Week, and to prepare all together for the Market. We ſhall ſuppoſe this the Caſe, as it is a very common one, and lay down a Method by which ſhe may in Summer be able to keep her Cream the whole Week without its growing ſour, though in the common Courſe of Things it would be ſo in three Days.

This is to be contrived thus. We will ſuppoſe the Market Day Thursday. Then Friday may be called with her the Beginning of a new Week; but as her Cream will have been gathering ſooner, we ſhall trace it from that Time.

In order to prepare for the Market on Thursday, ſhe has been churning on Wednesday, and ſhe will have taken into her Churn the Cream of Wednesday Morning, that is, what was ſkimmed from the Milking of Tuesday Evening, the laſt that can go into the Account of that Week.

The Wednesday Morning's Milking is ſet

for Cream, and that is taken off at Evening but ſet by, this therefore is the firſt Parcel for the ſucceeding Week: to this is to be added all that follows till the WEDNESDAY Morning again, which ſhe is to preſerve for the Churn on that Day. Let every ſucceeding ſkimming be mixed with this firſt, and on SATURDAY Morning let her ſet all the Cream ſhe has got over the Fire, and let it juſt once boil: this done let her put it back into a clean Pan, and then add to it all that is taken off the Milk during the following Part of the Week, but let her every Day change the Veſſel in which it is kept, pouring it daily into a freſh one well cleaned and aired.

It is very ſtrange to ſee the Effect of this, the boiled Cream not only keeps good itſelf, but by the Practice of every Day putting into a freſh and perfectly clean Veſſel, it preſerves all the reſt from being ſour. This has been frequently tried in the Neighbourhood where I now live, and when it has been done with due Care has always ſucceeded.

We have now conducted the Houſewife from the milking of her Cow to the preſerving of her Cream, as long as her Convenience requires, and as it is then to be made into Butter, that comes next under Conſideration.

CHAP. XIV.

Of Butter.

WE have obſerved that Butter is the oily or fatty Part of the Milk, which firſt ſeparates of itſelf in Form of Cream, and after that needs but little Trouble, at leaſt but little Art to bring it into the Condition of an elegant ſolid, yet ſoft Subſtance, pleaſant to the Taſte, and fitted for many Purpoſes.

When we conſider Butter in this Light, of a Thing ſo very deſirable, and ſo very eaſily obtained, it appears wonderful that the Knowledge of it came ſo late into the World; but 'tis certain that there were very many Ages in which it was not known, and many Countries in which it was not uſed in Food long after the reſt of the World were perfectly acquainted with it.

The Greeks, Poets, and Philoſophers frequently mention Cheeſe, and yet the Name of Butter is not found in their Writings. It is certain that the only Uſe they made of Milk in thoſe Times was to drink it alone, eat it with Mixtures, or make it into Cheeſe; for not only they are ſilent on the making Butter, but it is evident from the whole Tenour of their Writings, there was no ſuch Thing in uſe among them.

ARISTOTLE has written largely of Milk and its Products, but among theſe there is not a Word of Butter; he only treats of Cheeſe of ſeveral Kinds, and the Whey, of which there were alſo ſeveral Sorts, according to the Manner of making the Cheeſe.

The ROMANS made Butter; but what is yet more ſtrange than the former, they, though they had it, never conſidered it as an Article of Food; they uſed it as a Medicine; and we read their Sentiments concerning it in PLINY, where we find they were well acquainted with its Uſe in other Countries. It is very well known that the People of the EAST INDIES knew nothing of Butter, till the DUTCH took it over to them.

We ſee in this an Inſtance of a very great Truth, which is, that the moſt familiar Things may be a long Time over-looked, and that what every Man wonders he did not find out himſelf, as ſoon as the Secret is diſcloſed to him, Millions beſide himſelf may have left all their Days undiſcovered.

Butter is made from Cream by the Aſſiſtance only of Motion: this may be given it any Way, and provided it be in a proper Degree, the Effect will be produced. This Motion in the common Way of performing it is called churning; and the Uncertainty of that has led the Ingenious to contrive many Methods of ſupplying the Place of beating by the repeated Labour of the Hand, ſome of theſe are much worſe than the old plain Way, and there are others that really deſerve the Name of Improvements.

There are certain Particularities relating to Butter, much better known than underſtood: it will be very well worth while for thoſe who have the Convenience of being upon the Spot, to endeavour to diſcover the Reaſons. In the mean Time all we can do is to mention the Facts.

SUFFOLK Butter is famous for keeping, which is a Quality of ſo much Importance, that every Method is to be taken in Hope of finding the Cauſe of it. Indeed there are Methods of makeing any Butter keep longer than may at firſt be imagined practicable; if good Butter be made up in Lumps of forty Pounds Weight, and a little more Salt be put in than is uſually allowed, and they be afterwards put into a large Bin of Flour, they will keep the Year round without Damage.

Toward the End of Autumn Butter is apt to taſte bitter. This is one of thoſe Things better known than its Cauſe; it has been ſaid that the Reaſon is, that Graſs beginning to grow bare at that Time, the Cows eat the Leaves that fall from the Trees; but however true it may be that Cows will feed in this Manner, it is not true that this is the Cauſe of the Butter's being bitter; becauſe in the Fen Countries, where there are no Trees, and where Ditches ſerve inſtead of Hedges for incloſing, the ſame Thing is apt to happen at the ſame Seaſon, as in Places where there is ever ſo great Plenty of Wood.

Though we cannot abſolutely aſſign the Cauſe of this, we can tell the Houſewife how to prevent the Damage, which is enough for Uſe if not not for Curioſity. There needs no more to this than to ſkim the Cream after a ſhorter Time ſtanding. We have obſerved before, that when Milk ſtands too long the Cream hardens on the Top of it, and the Butter made from ſuch Cream is bitter; this ſhews that too long ſtanding alone may be a Cauſe of Bitterneſs in the Butter, and for that Reaſon, where there is Danger of the ſame Accident from any other Cauſe, one would take Care to prevent this from joining to make it worſe: on this Principle has been founded the Practice of ſkimming Milk earlier at that Seaſon of the Year, and the Conſequence has ſhewn that this alone will prevent the Bitterneſs of

of the Butter, whatever elſe was the Cauſe that would have made it ſo.

In Devonshire, and ſome other Places, they make a particular Kind of Butter, which from the Manner of ordering the Cream, is called ſcalded Butter. The Advantage of this is not only its being particularly well taſted, but that it will keep a Month without Damage. The Way they raiſe their Cream for this Purpoſe is the ſame the Chemiſts uſe when they have a Mind to give any thing a gentle Heat, without burning it to the Veſſels, and which they call a Balneum Mariæ, or Water Heat.

It is done in the ſcalding the Devonshire Cream thus.

They ſtrain the Milk into Veſſels as is uſual, and ſet it by for the Cream to riſe. Ten Hours afterwards, when the Cream is riſen in the common Way, they ſet the Veſſel with the Cream, Milk and all, over ſome Water in another Veſſel, ſo that the Water reaches half Way up that wherein the Cream is: this done they ſet the Veſſel of Water over a Stove, and gently heat it till the Cream is thoroughly and perfectly riſen, and the Milk underneath is quite thin and blue. The gradual and ſoft Heat does this, throwing up the whole Cream perfectly, and at the ſame Time doing it a great deal of Service, for the Article of keeping by the Heat.

When it is in this Condition the Cream is ſkimmed off with a ſkimming Diſh full of Holes, and the blue Milk is let to run perfectly away from it.

In this Condition it is a Kind of clouted Cream, the Fire ſo gently conveyed to it has done it great Service; and it may be kept with proper Care ſeveral Days, ſo that enough of it may eaſily be got together for churning. All that is needful for preſerving it during this Time, is ſhifting it once in four and twenty Hours into a freſh and perfectly clean Veſſel. This is one of theſe Inſtances wherein we ſee the Value and Advantage of Cleanlineſs, but it is not particular, its good Effects are univerſal. As to the churning of this Cream no Difference is to be uſed from the common Method.

CHAP. XV.

Of churning.

THE Cream is now ready for the Churn, whether freſh or kept according to the Rules we have given for that Purpoſe, and we ſuppoſe the Time arrived when Convenience calls for the making of the Butter. We ſhall conſider firſt the common Way of making it with the old faſhioned and long uſed Churn. This is a Veſſel of Wood, tall and deep, wideſt at the Bottom and narrower to the Top, where it has a Cover that falls in cloſe, and has a Hole in its Middle. Through this Hole is let the Handle of the Inſtrument, wherewith the Cream is to be beat; this conſiſts only of that Handle, and a round Board, like a broad thick Trencher at the Bottom, in Size ſuited to the Middle of the Churn. When this is put in, the Handle is let through the Hole of the Cover, and that is then put on and faſtened down. This is the whole Contrivance of this familiar and uſeful Inſtrument; all that is required for making of Butter is well beating of the Cream. And it is very well done by this Inſtrument, for the Cream being in the Churn, the working of the Handle up and down in the Hole of the Lid naturally agitates and beats the Cream, and the faſtening of the Cover prevents its riſing out.

This Churn, which is the good Houſewife's old Implement, is to be made clean with all poſſible Care, by thoroughly waſhing and ſcalding, and then expoſing it to the Air to ſweeten and purify. When every Part belonging to it is thus perfectly cleaned, it is to be brought into a proper Part of the Dairy, and this differs according to the Seaſon, for which Reaſon there can be no particular fixed Place for its ſtanding.

All Niceties are to be obſerved in churning, for it is well known to the Houſewife, to be a very precarious Article; and often when all the Care poſſible is uſed, the Work goes on very vexatiouſly, and the Butter will not, as they expreſs it, of a long Time come.

A moderate Temperature of the Air is the moſt favourable for the working of Butter; wherefore, according to the Seaſon of the Year, this muſt be favoured by the Place of the Churn. In every Dairy there are ſome Places warmer and ſome cooler than others. Now in Winter the Churn muſt be ſet in the warmeſt Place; and in Summer on the contrary it muſt ſtand in the cooleſt, for the Succeſs of the Work.

In the ſame Manner the Time of churning muſt be varied according to the Weather. In the Heat of Summer, the Weather being naturally too hot for the making of Butter, no Hours are proper but either very early in the Morning, or very late in the Evening, becauſe then only the Air is in that temperate Way, ſo eſſential to this Buſineſs; on the other Hand, as the Air is too chill and cold in Winter, the ſame Caution muſt be uſed in an oppoſite Manner of Choice, that is, the Middle of the Day, and no other Time is to be taken; becauſe it is at the Noon Time alone, in theſe Seaſons, the Air is any thing like temperate.

The Hour and the Place of the Churn being fixed, the Houſewife has nothing to do but to go to work. She is firſt to ſtretch a coarſe, ſtrong, and very clean Cloth acroſs the Top of her Churn, and into this to pour the Cream. Cleanlineſs we have all along preſcribed as the firſt Virtue of the Dairy, but here it is ſo very eſſential, that the Admixture of the leaſt Particle of Dirt might prevent the whole Buſineſs, and all the Labour be done in vain. When the Cream is ſtrained and preſſed through this Cloth, the Churn is to be covered in with the whole Preparation, and the Maid is to go to work.

There is great Uncertainty as to the Time of the Butter coming, but this depends more upon the Manner of beating, than any of thoſe fantaſtical Cauſes to which it has been aſſigned. Thus a heavy, tedious, dull Manner of beating gives the Cream Time to gather again between Stroke and Stroke, when it was about to break; and on the contrary, the ſwifteſt Work does the moſt Buſi-

neſs. Therefore let the Miſtreſs firſt examine the Manner of working of thoſe who complain, ſhe will commonly find Lazineſs is the Devil in the Churn, that ſets his Spell upon the Butter. Let her overſee the Work at firſt, and ſee it is done briſkly, with ſwift, ſharp Strokes, and tell the People, for their own Sakes, to continue it in the ſame Manner.

She will know by the Sound of the Strokes how the Work goes on. At firſt the Noiſe is deep, ſound, and heavy; but after a Time, the ſooner the ſharper the Strokes, it will begin to be higher and ſharper. This is a Proof the Cream begins to ſeparate from the thinner Part that yet remained with it, or as they commonly expreſs it, that the Butter comes: the Work is now to be continued with the ſame Spirit and Earneſtneſs, and the Effect will ſoon follow. The Staff will be perceived to work lighter; and ſoon after this, upon opening the Churn, and examining the Top of the Lid on the Inſide, there will be found Drops ſticking to it that look yellow. The Butter is now coming, and there will ſoon be an End of the Labour, for theſe Drops are abſolute Butter, and when the Change is thus perfect in one Part, it will not be long before it is ſo throughout; after a few Strokes more let the Churn be again opened, and there will be found Butter on the Sides as well as Lid, and every where, ſo far as the Splaſhing can reach.

The Butter is now made, and is only to be got together. For this Purpoſe the Lid and Inſide of the Churn muſt be ſcraped clean, and the Butter, which is got off from them, muſt be put down among the reſt into the Body of the Churn; then all is to be covered up again, and the Work continued, but not with hard downright Blows, but with a Kind of ſlight rounding Strokes; for all that is to be done now is to get the Butter together into a Lump in the Churn, that none of it may remain in ſeparate Pieces. When this is done the Butter is finiſhed, and is to be taken out of the Churn.

This is the general Method; and theſe which we have named are the Cautions always to be obſerved: but having thus far explained theſe, we ſhall now enter upon thoſe Particulars which promote or retard the Formation of the Butter in the Churn, that the Houſewife being aware of what will prevent her Succeſs, may guard againſt it; and knowing what will forward it, may purſue it.

The Temper of the Air we have named already, as a very great Article, and are to repeat the ſame here on another Occaſion; for it not only may retard the coming of the Butter, but may ſpoil it when it is made.

Over hot Weather not only makes churning difficult, but the Butter, when it is made, is ſo far influenced by the Weather, unleſs properly guarded againſt, that it is whitiſh, brittle, and bitter; we have ſhewn how to avoid theſe Accidents, by taking an early or late Hour and a cool Place. The early Hour is better than the late, for the Air is cooler in the Morning before the Sun riſes, than it can be in the Evening, after it is ſet, becauſe in one Caſe it has been heated all the Day, and in the other it has been all the Night cooling; as to the Place, the hotter the Seaſon the cooler that muſt be. I have ſeen very fine Butter made at Noonday in AUGUST, in an Ice-houſe. This may ſerve as a Proof how poſſible it is to countervail any Heat of the Air, by the Coldneſs of the Place. Ice-houſes are not in the Farmer's Power, but neither need he uſe the Middle of the Day for churning, a cool Cellar, or the deepeſt and remoteſt Place in his Dairy, two Hours before Sunriſe in a Morning, will be equal in Coldneſs to the Ice-houſe at the Middle of the Day.

In the coldeſt Time of Winter it is often very difficult to make the Butter come at all; and I have ſeen ſo much of this, that I think the Experiment I ſaw tried in the Ice-houſe could not have ſucceeded as it did, were it not that the Cream when carried in had a great deal of Heat in it from the common Temper of the Air, and the Butter came before the extream Cold of the Place had any great Effect upon it.

Having thus laid down the general Principles, and explained the Reaſons of the Difficulties which often perplex the Houſewife in her churning, we ſhall in the next Chapter lay down a few plain, eaſy, and practical Rules for her Aſſiſtance.

CHAP. XVI.

Particular Rules relating to churning.

IN Summer, as the Heat of the Air is the Occaſion of the Difficulty in bringing the Butter, the Houſewife muſt take all poſſible Means to prevent adding to the natural Heat of her Cream, and to cool it gradually.

We have adviſed very briſk working of the Staff in general, but here muſt be a Kind of Exception, for too much Motion will occaſion Heat; and therefore in extream ſultry Times it will be better to manage the Blows accordingly, making every Blow ſmart and ſure, but not repeating them ſo quick upon one another.

There is ſome Myſtery and Art in churning at any Time, but it is at this that the main Difficulty occurs; and if it be not managed according to theſe Directions, there will be a great deal of Perplexity and Plague.

In the next Place, let the Houſewife take Care that ſhe does not add to the Heat occaſioned by the Weather, by any Heat in the Churn itſelf; and farther let her abate the Heat when it is naturally ſo much that nothing can be done by cooling it.

With Reſpect to the firſt Article, as her Churn is to be ſcalded in order to make it perfectly clean and ſweet for the Uſe, let her take Care that it be thoroughly cooled, before ſhe puts her Cream into it. Scalding Water gives a great deal of Heat, and Wood keeps it a long Time: therefore let the ſcalding of the Churn be the firſt Thing done in the Preparation for the Work, and let the Churn be thoroughly examined by the Hand half an Hour at leaſt before it is uſed, that it may be cool. Wood will retain Heat when the Hand does not feel it, but half an Hour's cooling, after no more is perceived, will

ſet it right. To add to this in very hot Weather it will be well to wet the Outſide of the Churn with Pump Water freſh pumped, a little before the putting in the Cream, but the Inſide muſt not be wetted ſo near the Time.

Under theſe Cautions, and uſing the proper Hours, there is Reaſon to hope the Butter may come without much Difficulty; but if, after a moderate Time, there be no Appearance of it, as nothing can be reaſonably ſuppoſed to be the Cauſe but Heat, let a Waſhing Tub be a third Part filled with freſh pumped Water, and brought to the Place where the Maid is churning; let the Churn be placed into this, and if the Water do not reach as high up the Outſide of it as the Cream riſes within, then let more be added till it does: let the Work be now carefully continued, and commonly, as ſoon as the Effect of the Water is felt through the Wood, the Butter will begin to come. It is not only that the Cream is thus brought to that Condition of Warmth, in which the Butter comes beſt, but the ſudden Change is of great Aſſiſtance: the ſame Effect that the cold Air of the Ice-houſe in the before-mentioned Experiment had upon the Cream, the ſudden Chillneſs of the Water ſhews in this Caſe; and doubtleſs, as a conſiderable Change is to be made in the Thing itſelf, for the Difference is really great between Butter and Cream, this quick Shock, better than any other Way, brings it about.

Theſe then are the little Particulars by which the Houſewife will be able to aſſiſt herſelf, in Caſes when the too great Heat of the Weather prevents her Succeſs; on the contrary, when her Difficulties are owing to too cold an Air, ſhe muſt, in the ſame Manner, aſſiſt Nature by giving a little Warmth.

We have adviſed her, in the other Caſe, to be very careful the Churn be cool from the ſcalding, but in this ſhe will do well to examine the Veſſel how it cools by Degrees, and to ſtrain in her Cream while there is yet ſome Warmth remains in the Churn, from the Water that cleaned it. This will give a little Help to the Cream; and the Maid muſt be ordered to work it more briſkly than ordinary; indeed the Coldneſs of the Weather uſually puts her in Mind of this, and the leſs Admonition is needful.

If with this Aſſiſtance the Butter do not come, let the Churn be taken into the Kitchen, and placed not within the Reach of the Fire directly, but in the Air of it, this will by Degrees bring the Cream to the due Temper. Then the Work of churning is to be continued briſkly, and it will not be long before there come good Butter.

There is generally more Trouble in getting Butter in very cold Weather, than at any other Time, but by theſe little Aſſiſtances it will be greatly alleviated; and there is nothing in all this that will be at all prejudicial to the Taſte or Colour.

CHAP. XVII.

Of the waſhing and making up of Butter.

THE Butter being now formed in the Churn, and by the laſt Strokes worked together into one large Lump, is to be taken out and finiſhed by a gentler Operation; the Strokes of the Churn would be now too harſh, it muſt be moulded in the Hands into a better Conſiſtence.

It is to be underſtood that Butter, when thus made in the Churn, is far from its Perfection. It is ſeparated from the watery Part in ſome Degree, but not entirely. The whole Operation depends upon this, that as in Milk there was a richer Part and a poorer, which being ſeparated by ſtanding, the richer Part ſwims at the Top, and is Cream; ſo in the Cream itſelf there are two ſeparate Subſtances, an oily, which is properly the Butter, and a watery, which is the Buttermilk. The ſeparating of theſe is what we call making of Butter.

This Separation is performed by agitating of Cream in a due Degree of Heat, and this being done perfectly the Butter is perfectly made. Now the Churn does this but imperfectly, being a clumſy and unweildy Inſtrument; but it makes a good Beginning, and the Hand is afterwards very well able to finiſh it.

This finiſhing conſiſts in two Articles, the perfectly ſeparating the Buttermilk, or thin Part, and the cleanſing the Butter from any accidental Foulneſſes that may have got into it, for this is always poſſible; and it is to be done in this Manner.

The Lump of Butter in the Churn is to be taken up with both Hands, and removed out of the Liquor. In this there comes a Conſideration, which is only to be determined by the Time the Butter is intended to be kept: if that be ſhort, that is, if it be made for immediate Uſe it is to be thrown into Water immediately, on taking it out of the Churn, if otherwiſe not.

Therefore whichever be the Caſe, let a very clean Pan of Earthen Ware glazed, be ſet ready by the Churn, and if the Butter be deſigned for Uſe immediately, let this be half full of clean freſh Water; if not let it be empty.

The Lump of Butter being lifted out of the Churn muſt be put into this Pan, and there worked thoroughly to and fro in the Water, or without, labouring it with both Hands, and moving it frequently about; by this Means the Buttermilk that remained in it after the churning will be thoroughly waſhed out, and the Butter will be pure and of a firm and good Conſiſtence: the well working, turning, and toſſing the Lump at this Time of the Operation is a very material Article, for to that alone the Butter owes its Purity, its good Conſiſtence, and in a great Meaſure its Colour, at many Times of the Year. I have ſeen Butter that looked white and chalkey, on taking out of the Churn get a very good pale Straw Colour, in the frequent and repeated working in the Hands among Water.

The

The Buttermilk being thus perfectly separated, one of the two Points intended by the working in the finishing of it up, is obtained; the other is the perfectly cleaning of it.

So much Care as we have advised, one would think, would keep out Dirt from the Butter, but it does not always happen; for a Rag of the straining Cloth, a Hair, or some other Impurity, may escape the Observation; and any thing, the least imaginable in this Kind, may damage the Butter in the Respect of Sale, and will always be a Blemish in the good Housewife's Character.

The working the Lump in the Hands may discover some Foulness of this Kind, which must be picked out as soon as seen; but lest any should have escaped the Eye, the whole must now be taken out of the Water, and cut cross and cross many Times with a Knife, till every Part of it have had the Knife in it, this will find out any little Thread or Hair, and thus it is to be made entirely clean.

The last Thing to be done is the salting. We are not here speaking of the salting that is to prepare Butter for long keeping, but just of that which is done to give it a Relish. Butter is very insipid when it is made up entirely without Salt, so that the freshest should always have some. It is to be worked into it in this Manner. The Butter that has been cut and cleaned is to be spread out thin with the Hand, in the Bottom of a broad shallow Dish; and then a very little Salt is to be sprinkled carefully over it, the Design being to mix it as equally as possible in the whole Quantity; it is then to be worked up well in the Hands, and is done: it may be wrought up into Rolls, Lumps, or Dishes, or formed in any Shape most saleable at Market, or most convenient in the Family. Having thus gone thro' the whole Work of making Butter, and makeing it up fresh, we shall proceed to the salting of it, that being a very essential Part in the Farmer's Traffick in some Places. But here, as we have named only the plain good old Family Way of churning, it may not be amiss to observe that there are others which have their Use.

The Sweep is a Kind of Churn which works in the Manner of a Pump, and is used with a great deal of Ease and Advantage in many Places: in other Parts of England they prefer the Barrel Churn, and it also answers very well; these Instruments are to be had at the Turners, therefore I shall say no more of them here, as I shall not take upon me to recommend them, though I allow they are good in their Kinds; the other always, so far as I have seen, very well answering its Purpose.

The greatest Preference that is made for using these, is the Quantity they can manage, and the Expedition of the Work; but I have seen twenty Gallons of Cream wrought at once in a common Churn, big enough to hold thirty; and this Quantity brought to Butter in about an Hour. When the Quantity is so large a Woman alone is not able to manage it, but a Man and Maid do it perfectly well.

In hot Weather Butter, though very well made, will sometimes continue too soft, and this will be a great Disadvantage in Respect of the Carriage to Market, and sometimes hurts the Sale. In this Case, as the Cause is known, the Remedy is easy. Too much Heat being the Occasion, a little additional Cold will set all to rights. This may be done with great Ease by the Help of a Well, which is a Convenience few Farms want. Let the Butter, when it is thoroughly made, and properly salted, be rolled into Lump Pounds, or half Pounds, according to the Demand there is expected for those several Sizes, and put carefully into a Basket: let a long Rope be fastened to the Handle of this Basket, and let it be let down into the Well till it come within two Foot of the Water. In this Way let it hang all Night, taking Care no Accident happen to it by Thieves or Carelessness of Servants, and in the Morning let it be drawn up and sent to Market. The cold Air that lies just above the Water in the Well, will have the same Effect as the natural Cold of Winter, and it will be as hard as Butter commonly is in November.

With Respect to the salting of fresh Butter, the particular Fancy, and Taste, and Custom of the Country, are to be so far considered, that it is very difficult to establish any general Rule; but in a moderate Way we may say, that a Pint of Salt will serve for twenty Pounds of Butter; some go as far as a Pint and half for that Quantity, but 'tis too much, for only the Flavour of the Salt is wanted, to take off the Insipidity of the Butter: therefore the least that will do is best; but those who go much under a Pint to twenty Pounds do not answer their Purpose, for the Salt is not so much as tasted when so little.

CHAP. XVIII.

Of the making of Butter from new Milk.

AMONG the Improvements that have been made in Husbandry of late Ages, this may be very justly reckoned one, for in large Concerns it shortens the Trouble of a Dairy very much. As we have given the Rationale of Butter making in the preceding Chapter, there will not appear any thing strange or wonderful in the Attempt, or in the Success of making Butter without the Trouble of first setting the Milk for Cream.

It has been seen that when Milk stands an oily Part separates, mixed with some Water, this is Cream, which consists of Butter the oily Part, and Buttermilk the watery. This is afterwards beat, that by Means of the Motion the remaining watery Part may be separated from the pure and oily.

Now it is plain that this oily Part, which is wanted for Butter, is originally in the Milk; and there is no Reason to wonder that beating, which in the common Way of working, drives out the watery Part, and separates the oily from the Cream, may in a greater Degree, separate this oily Part at once from the Milk.

This is the Principle upon which they proceeded, who first set up the Scheme of new Milk Butter, and it answered accordingly.

It is for this Use that Machines, and other Contrivances, are to be called in to the Assistance of the Farmer, the Quantity of Milk not reduced

duced to Cream being too great for the good old Implement the Churn; and the Labour required for ſeparating this oily or buttery Part from it, is ſo much greater than is needful for Cream, that no human Creature could be well expected to go through it. Therefore it has been properly contrived for this Purpoſe, that the Veſſels ſhall be very large, and eaſily put into a violent Motion, and that the Work ſhall be performed by a Horſe.

In ſome Places they contrive to uſe an Implement not unlike a common Churn for this Work, but it does not do near ſo well as thoſe Barrels that run round, with Stops in them for that Purpoſe.

The Farmer who has a Mind to fall into this Way, will eaſily get the Machine, the Structure of it being ſufficiently underſtood among the Mechanicks in moſt Parts of ENGLAND; but he may, by freſh Contrivances, ſave himſelf a great deal of Labour and Trouble: he may contrive his milking Place in ſuch a Manner, that the Milk may come directly from the Cow, through a Pipe, into the Veſſel; which, when the milking is over may be ſet in Motion, and at once make the Butter.

As we have named the Benefit of this Method, which is for the managing a great Quantity of Milk with little Trouble; it will be proper we fairly ſet before the Farmer alſo its Inconveniences. The principal of theſe is, that the Butter made this Way, though very good for preſent Uſe, is not found to keep ſo well as that made in the common Method.

The Buttermilk that is made this Way ſupplies a tolerable Kind of Cheeſe with little Trouble: they let it out into other Veſſels, and then add Runnet, and it comes to a Curd very readily.

Having thus gone through the Articles that naturally fell in the Way, before we come to the ſalting of Butter, we ſhall proceed to treat of that important Article in a plain and practical Manner.

CHAP. XIX.

Of ſalting of Butter.

IT is often neceſſary, and always profitable to ſalt Butter at certain Seaſons; but there are Times of the Year more proper than others. In general, the Butter of the early Part of Summer is not ſo proper for ſalting; and that of no Time is ſo good as what is made from the Middle of AUGUST to the latter End of OCTOBER.

The firſt Difference that is to be obſerved in the making, is when it is taken out of the Churn. We have ordered freſh Butter, that is, ſuch as is intended to be kept freſh, to be put into a Pan of Water, and there worked with the Hands to get out the Buttermilk, but in the Butter intended for ſalting no Water muſt be uſed to this Purpoſe. 'Tis to be put out of the Churn into an empty Pan, and there worked between the Hands, to ſqueeze out the Remainder of the watery Part.

This done the Butter is to be mixed with Salt, which is to be worked in with the Hands, the more the better, the Way is to ſpread out the Butter as in mixing that ſmall Quantity of Salt with ſuch as is intended for immediate Uſe; but inſtead of that ſmall Portion, as much as can be got in is to be added here, and when the whole is well mixed, the Butter thus prepared is to be put up in Pots or Barrels: for large Quantities Barrels are needful, but for leſſer Quantities Pots are more proper; but they muſt be well glazed, otherwiſe the Brine will eat into them. In Pots it is proper to lay in a thin Bed of Salt before the Butter is put in, and when it is put up then to lay another Bed of Salt over the Top of it.

In many Places where they barrel up large Quantities, they alſo pierce Holes through with a Stick, quite from the Top to the Bottom of the Barrel, and making a very ſtrong Brine, they pour in a Quantity of it over the Butter, and let it run down all theſe Holes, which is of great Service in preſerving the whole.

Some, inſtead of a Bed of Salt upon the Butter when they have potted it, pour over it a Quantity of ſtrong Brine, and this is no bad Method.

As for the keeping, which is the great Purpoſe for which Salt Butter is deſigned, though it muſt not be waſhed when taken out of the Churn, yet a great deal depends upon the getting the Whey well out, which can only be done by thorough working it in the Hands; and this is the more material, becauſe otherwiſe it would diſſolve and carry away a great Part of that Salt that was uſed in preparing it, ſo that it would fail.

As to the Quantity of Butter reaſonably to be expected in proportion to the Number of Cows, Accidents will make a great Difference; but in the Butter Countries they generally account that they may, one Year with another, expect from ten Cows a Firkin and half of Butter in a Week, in Summer; and from the ſame Number a Firkin in Winter. The Difference of feeding makes a great Variation in the Goodneſs of the Butter, and none is worſe than ſuch as is made when the Food is between wet and dry, as is the Caſe in the Beginning of Spring and latter End of Autumn, the Food being at thoſe Times between Graſs and Hay, and that Irregularity having a great Effect to the Diſadvantage of the Milk.

There are two Ways of making Salt Butter freſh, when there is Occaſion for it; and it is poſſible, by ſalting up the Butter in the cheap Times, and freſhening it when dearer, to make ſome Advantage.

The Method for the Service of a Family is by beating it up with new Milk; but when it is done by Way of Advantage, and for the Market, the Way is to cut it into thin Slices, and put it into the Churn where Cream is beating for freſh Butter. A good Quantity may be added in this Manner, but there is an Art in juſt hitting the Time. It muſt be put in when the other Butter begins to come, otherwiſe it will pervert and diſturb the Operation; but in this Manner it goes on very well with the reſt, and if not too long kept will, on being waſhed with the reſt, paſs with it as very good freſh Butter, not at all debaſing the Price.

CHAP. XX.

Of Whey Butter.

WHEY Butter is a Thing little known in London, but 'tis often made in the Country, for the Service of Farmers Families. It is like other Butter, but poorer and rank; and made from a Cream got out of Whey, as the other is from the Cream of new Milk. We have ſhewn how a Kind of ordinary Cheeſe is made from the Buttermilk, when new Milk is churned for Butter inſtead of Cream; and in the ſame Manner in this Inſtance, a poor Kind of Butter is made from the Whey of Curds made from new Milk.

All this depends upon one and the ſame Principle, which that all the ſucceeding Part might be naturally underſtood, we laid down in the Account of Milk. This is that there are in it three diſtinct Subſtances, an oily, a curdy, and a watery Part; now by whatever Method any one of the two firſt is ſeparated, the other will always, more or leſs, remain in the watery Part that is left. This is the whole Matter. When new Milk is wrought at once for the Butter, the curdy Part is left behind, and the Addition of Rennet to the Remainder makes a Kind of Cheeſe; and juſt ſo when Rennet is at firſt added to new Milk, the curdy Part only is ſeparated, the oily Part remaining, in ſome Degree, in the Whey; and this oily Part being ſeparated from the Whey makes the poor Kind of Butter, thence called Whey Butter.

The Method of making it is thus. When Curds have been made from new Milk, the Whey which is drained off is to be ſet in large Pans, or other broad and ſhallow Veſſels, and placed in a quiet Part of the Dairy, juſt as new Milk would be for Cream; there will riſe a Cream upon this, though not like that from new Milk, and it is to be ſkimmed off and churned in the ſame Manner.

The Butter this yields, we have obſerved, is very poor, but in ſome Places they enrich it, by adding a fourth Part of new Milk Cream to the Whey Cream; theſe, in any Proportion, mix very well together, and the Butter is the better according as the more of the new Milk Cream is uſed; that bringing it ſo much nearer the Nature of the other.

Beſide the inferior Quality of the Whey Butter, its Quantity in proportion to the Cream, is but poor. The ſame Meaſure of Whey Cream yielding but about half as much Butter as the other: neither will the Whey Butter ever come to a good Conſiſtence, nor will it keep, ſo that at the beſt it is but a very poor Matter: however, it may be worth the Farmer's while, in moſt Caſes, to make it.

CHAP. XXI.

A Method of taking off the ill Taſte of Milk.

WE have obſerved that however uncertain we may remain, as to the Cauſe of the ill Taſte Milk has at certain Times, yet the Effect is conſtant, and is very prejudicial to the Farmer; the Taſte being communicated from the Cream to the Butter, and reducing its Price and Eſtimation. To the Methods we have laid down for the preventing and remedying of this Evil, we ſhall here add a new and very particular one, the Invention of Doctor Hales, an Author not more diſtinguiſhed by his Genius, than by the conſtant Application of it for the Publick Good.

We have occaſioned the Method propoſed by the Gentleman, to be tried, and have found it anſwer ſo well that we ſhall not ſcruple to aſſure the Farmer, it is not more ſingular than ſucceſsful. The Inſtrument to be employed for this Purpoſe is very eaſily made and of ſmall Expence, and the Uſe of it very familiar. We ſhall therefore adviſe every Farmer to have one of them, and never to fail of uſing it when he perceives his Milk to be ill-taſted, from whatever Cauſe that may ariſe.

The whole is no more than this. A round Tin Box is to be made, of ſix Inches Diameter, and two Inches in Depth: the Lid of this Box is to be pierced full of Holes, they ſhould be about a quarter of an Inch diſtant from one another, and a twentieth of an Inch in Diameter. A Tin Pipe or Nozzel is to be ſoldered into the Middle of the Lid, and to riſe to ſome Height above the Surface, ſo as to receive ſecurely the End of a long Tin Pipe, through which the Air is to be conveyed into the Box; through the Holes of which it is to be blown up again through the Milk; this Tin Box being placed at the Bottom of the Veſſel.

The Tin Pipe that goes into this Nozzle is to be a little more than half an Inch in Diameter, and two Foot or more in Length, according to the Depth of the Veſſel.

To the Top of this ſtrait Pipe is to be jointed and ſoldered on another at right Angles. This ſhould be of the ſame Bigneſs with the other, but it need not be more than ſix Inches in Length.

To the End of this that is free, a Leather Nozzle or ſhort Pipe is to be fixed, and then the whole is compleated.

The Cover or Lid is beſt made deeper than the Box, and ſcallop'd in the Part that goes in; this lets the Air Holes have free Paſſage, and there is to be a Row of them on the upper Edge, where it is not received into the Box.

Every Tinman will be able to make this Inſtrument, and the moſt ignorant Servant may be inſtructed to uſe it: the Principle whereon its Benefit depends is this. The ill Taſte of Milk is ſo lightly mixed with it, that it may in a great Part be carried off, by blowing a Quantity of Air in diſperſed Particles through it; and this

this is to be done very conveniently by the Inſtrument now deſcribed.

The Tin Box is to be placed in the Middle of a large Veſſel, into which the Milk is to be poured as it comes from the Cow. The Tin Pipe is to be put into the Nozzle prepared for it, and when this is well fixed the Milk is to be poured in. Then, the Box being kept firmly at the Bottom, the Noſe of a Pair of common Bellows is to be put into the Leather Nozzle at the Top, and a Perſon is to blow for ſome Time.

The free Air is thus taken in by the Holes at the Back of the Bellows, it is forced down the Pipe by the Strength of the Blaſt, and it riſes through all the Air Holes in the Box, and thus paſſes in ſo many ſmall Streams up through the Milk.

When the Milk is but ſlightly ill taſted, it is thus to be poured into the Veſſel, as it comes from the Cow, and about forty Minutes blowing will perfectly ſweeten it; but when it is very rank the beſt Method is to make it ſcalding hot, and then pouring it in, to continue blowing till the bad Taſte is perfectly gone.

This Method, under proper Management, will make, at any Seaſon, perfectly fine Butter out of ill taſted Milk. In this laſt Caſe a great deal of Care muſt be taken not to burn the Milk to the Veſſel in heating; and it ſhould be kept warm during all the Time of the blowing.

The Author of the Experiment tried it upon the Milk of a Cow fed with Cabbage Leaves for eight and forty Hours; and though the Milk was very ill taſted in itſelf, it became perfectly ſweet in ten Minutes blowing. This was an Experiment with only a Gallon of the Milk, and it was kept hot by being ſet in hot Water during the blowing. The Cream produced by this had not the leaſt ill Taſte.

Some Caution muſt be uſed in blowing into large Quantities of Milk, becauſe of the Abundance of Froth that will riſe. If the blowing be too violent, this will ſwell over the Top of the Veſſel, therefore it is to be managed gently. The blowing muſt not be ſo briſk but that a Perſon ſtanding by may break the Bubbles, and keep the whole within Bounds; it will take ſomewhat the more Time the ſlower the blowing is performed, but the Buſineſs will be done as effectually.

But though the blowing may be performed more gently or more forceably, and the Effect be the ſame in the End, the Heat of the Milk muſt be carefully obſerved, for otherwiſe, when the ill Taſte is conſiderably great no Art will get it away.

The Experiment Dr. Hales tried, by feeding the Cow on Cabbage Leaves, was a very fair one for this Purpoſe; for excepting Crow Garlick, which the Creatures ſometimes eat in the Fields, there is nothing that gives the Milk ſo laſting an ill Taſte. A Cow's Milk will be made rank by Cabbage Leaves a Week after the Time of her eating them.

Crow Garlick gives ſo ſtrong a Flavour to the Milk, that no blowing will take it perfectly off when it is cold, though it abates it ſenſibly: but if the whole be kept warm for ſome Time, and well blowed, the Scent and Taſte will be carried entirely away.

When Milk is to be blowed in this Manner, for the taking away its ill Taſte, it will be proper to mix a little Water with it firſt. This Water ſhould be cold in Summer, if the Milk be blowed cold; and warm in Winter: but if the Milk be heated in order to the perfect cureing it by blowing, then the Water ſhould be put to it warm.

It is found by Experience that the Cream ſeparates better from Milk for the Addition of a little Water in the common Way of Management; for it thins the whole, and by that Means the Cream more eaſily diſentangles and ſeparates itſelf. In the Method of blowing it anſwers a double Purpoſe, it renders the whole Body of the Milk thinner, ſo that the Air paſſes more thoroughly and freely between its Parts, and the Surface is leſs frothy; ſo that the blowing may be briſker, and therefore the Operation ſhorter, and the Cream always riſes after this in a very free and perfect Manner.

There is one very peculiar ill Taſte that Milk has, and conſequently the Cream riſing from it, and the Butter made from that: this is a dead offenſive Flavour, worſe by much than any of the rank Taſtes named already: it riſes from the Cow's drinking ſtagnating, foul, and ſtinking Water. The Farmer ſhould, by all Means, prevent it, for it not only hurts the Credit of his Dairy, but endangers the Health of his Cattle; on this we ſhall treat farther in its proper Place, when we come to conſider the Diſorders of Cattle, their Cauſes and their Remedies; what concerns us here to obſerve is, that the ill Taſte may be got rid of by this Method of blowing Air through the Milk: but it requires the whole to be kept warm, and the blowing to be continued ſome Time.

All the ill Taſtes that happen to come into Cream are firſt in the Milk, and the beſt Way of attempting to remove them is always in the State of Milk, before the Cream is ſeparated.

In ſome of our Counties, when they perceive their Cream to be ill taſted, they heat it ſcalding hot, ſtirring it all the Time it is heating, and alſo till it cools again; and in other Places they heat the Milk for this Purpoſe before it is ſet for the Cream. Both theſe have a good Effect; but probably the heating of the Milk, when properly managed, will be found the beſt Method.

With reſpect to the curing the ill Taſte, by this Method of blowing, it muſt always be done to the Milk, not the Cream, for many Reaſons. It is more conveniently performed in the thin Body of the Milk, than in the thick Subſtance of the Cream: the thick Body of the Cream ſends up a Froth in the blowing, which is quite unmanageable: and what is much more eſſential, the Matter which cauſes the ill Taſte is much more difficultly removed in the Condition of Cream.

We have obſerved that the Addition of Water to the Milk aſſiſts and ſhortens this Operation, by thinning the Body of it; and from the ſame Reaſoning it muſt be more tedious, as well as more difficult, to get it out in the State of thick Cream; and ſo it is found upon Trial.

Theſe are the Reaſonings and Obſervations

of that excellent Philoſopher, confirmed and extended by ſome few Trials; the Succeſs of which ſeems to promiſe, that there will be great Advantage to the Dairy, in bringing this new Practice into general Uſe. We are ſenſible it will ſeem ſtrange to the Country People at firſt; but a fair Trial will recommend it to them, and it will ſoon be univerſal.

CHAP. XXII.

Of the Uſe of the Barrel Churn.

TO this general Account of the making of Butter, we ſhall join for the Sake of thoſe who like Improvements, the Manner of uſing the Barrel Churn: how far it is to be eſteemed we have ſaid already, but when it ſhall be introduced into any Dairy there requires a particular Management of it; and without the Knowledge of that the Farmer may never come at its real Advantages.

The beſt Way of making Butter with this, is out of Cream got in the uſual, careful, and cleanly Way, as we have deſcribed it before.

This is to be ſtrained into the Barrel Churn, as into the other, and the Advantage is, that turning upon a Spindle the Motion of this Churn, if well managed, is more regular than that of the other. But at the ſame Time we are to tell the Houſewife, that there requires a great deal more Skill in the Uſe of it.

The greateſt Miſtake I have been uſed to ſee made with this Churn, is the turning it about too quick. This is a very natural Error; for thoſe who know the Value of quick Strokes in the other, naturally fancy the quicker the Motion here the better; but the contrary is true, for I have ſeen Butter made and unmade again many Times over, by working it in this Manner.

On the contrary the right Rule is, that the Turning be gentle, ſlow, and ſteady; for this ſoft Motion on the Spindle is equal to a very ſharp beating in the downright Way. When this turning is done in the right, even, and eaſy Manner, the Butter comes quick, and comes very pure and fine.

It is naturally hard, ſweet taſted, and will keep; whereas the ſingle Article of too violent turning will make the very ſame Cream, in the ſame Churn, yield a ſoft, bitter Butter, that will not keep. One Thing farther muſt be obſerved, which is, that this gentle Motion muſt be kept up without Interruption, from the firſt Turn till the Butter comes, for all goes backward upon ſtopping. When the Motion has been too briſk, and the Butter is near made by it, I have ſeen, that on ſtopping a Minute only, the Cream and Buttermilk have mixed again almoſt as entirely as before, and the whole Work was to have been done over again, little otherwiſe than as if the Cream were then put freſh into the Churn.

We have told the Houſewife ſhe is to ſee the Barrel Churn turned conſtantly, without ceaſing, till the Butter comes: ſhe needs not to open it to examine into this, for ſhe will know by the Sound: there is a particular ſquaſhing Noiſe in the Churn when the Butter is come, which is quite different from what the Cream made in it before: when this is heard ſhe may be as ſure the Butter is made as if ſhe could ſee it; and then ſhe is not to order the Servant to ſtop, but only to turn more ſoftly and gently than before. This ſerves to finiſh the Separation of the oily or buttery Parts, and to bring them together into a Lump or Maſs: this muſt be continued half an Hour, and by that Time all will be perfectly done.

The Butter is then to be taken out of the Churn, and well worked with the Hand; and the Salt mixed with it according to the Intention of ſpending it freſh, or keeping.

In this and all other ſalting of Butter, it is a good Method to have the Salt beat to Powder: ſome have uſed Baſket Salt, becauſe of its Fineneſs, but it is dear and has little Taſte, in Compariſon of the other. Every Houſewife knows how to powder common Salt, by firſt drying it, and this is the beſt for the Uſe of ſalting of Butter.

In churning by the Barrel Churn all the ſame Cautions are to be uſed as in the other Way, reſpecting the Seaſon of the Year and Condition of the Veſſels. The Churn of this Shape muſt be kept as carefully and perfectly clean as the other: in Summer it muſt be well cooled from the ſcalding, or occaſionally freſh cooled, juſt before the putting in the Cream, with cold Pump Water; and in Winter it ſhould be left warm from the ſcalding. In theſe and all other Reſpects, the Difference only is in the Manner of giving the Motion to the Cream, and the whole Procedure, from the ſtraining in of the Cream to the working up of the Butter, is to have no Difference.

CHAP. XXIII.

Of Cheeſe.

CHEESE is the Article next in Conſideration to Butter, when we are treating of the artificial Products of the Farmer's Stock; it is made, as we have ſhewn in general before, of the curdy Part of Milk, as Butter is of the oily; and according to the Condition of the Milk, and other Circumſtances, it becomes of various Kinds, Taſtes, Qualities, and Prices.

All Cheeſe is the curdy Part of Milk, ſeparated from the Whey: but in ſome Kinds it is only the curdy Part, without the oily or buttery; and in others it is the whole mixed together, only the Whey being ſeparated: there are alſo Kinds of Cheeſe that have different Proportions in this Mixture. In general, as it is the curdy Part of Milk that gives the Conſiſtence and Form to Cheeſe, ſo it is the creamy or buttery Part mixed therewith, that gives it the Mellowneſs and Richneſs.

The Farmer's Servants well know what Cheeſe that is which is made of new Milk Whey, whence all the Butter has been taken; and the Cheeſe of Parma, and other of the Italian Dairies, ſhews us how excellent a Production it may be when the whole of a rich Cream is mixed among the curdy Part in the working.

We have ſome Counties in ENGLAND remarkable for the good Cheeſe they produce, and others for the bad: this has by ſome been laid entirely upon natural Faults, as the Soil and Graſs; but it is in a greater Meaſure owing to the different Conduct in the Dairies of thoſe ſeveral Places. We ſhall ſhew in the ſucceeding Chapters, that a good Houſewife will make good Cheeſe any where. We do not mean by this that the Milk produced by the worſt Food, will yield as good Cheeſe as that produced by the beſt, the Folly of ſuch an Aſſertion would be obvious to every one; but what we would have the Houſewife underſtand is this, that when the Food is the ſweeteſt, richeſt, and beſt in the World, a bad Manager may make bad Cheeſe out of the Milk; and on the contrary, that one who underſtands how to make the beſt of indifferent Advantages, will make good Cheeſe upon poor Land.

There are two Ways in which Cheeſe is naturally ſpoiled by the Paſturage of the Cattle: the one is when the Food is ſo poor that it impoveriſhes the Milk, ſo that its curdy Part has neither the true Strength nor natural Flavour: and the other is when Weeds grow in Abundance among it, which give it an ill Flavour, the Principal of theſe are Melilot and Garlick. As to theſe the Remedy is eaſy, for they may be pulled up: as to the other there is no Way of mending it, unleſs the Farmer have got better Paſtures, into which he can put them; if not he muſt be content with indifferent Cheeſe.

It will then become the proper Conſideration, whether he ſhall engage in the Cheeſe Way at all: and this he muſt learn by Trial of the Milk, to the two different Purpoſes of Butter and Cheeſe.

Although we cannot enter into the Secrets of Nature, ſo far as to penetrate Cauſes always, we have at all Times our Eyes open to Effects: theſe are ſo many Principles on which to found our Reaſonings, or what is better our Conduct; and theſe will be ſufficient for the Farmer's Purpoſe.

There are Paſtures that yield a Milk fit for Butter, but not for Cheeſe, and others that yield ſuch as is excellent for ſome Kinds of Cheeſe, but unfit for Butter. Therefore when the Farmer firſt ſets himſelf down upon his Land, he is to conſider firſt, which is the moſt profitable Manner of employing his Dairy in his Situation: if the Paſturage be equally proper for either Commodity, then let him principally turn his Thoughts to the making that which is moſt marketable; but if it will only ſerve well for one, let him take that, which ever it is; for Cheeſe and Butter are Things for which there will always be a Demand every where, although not equally in all Places.

Now when the Farmer ſhall find that his Land does not yield a Milk that gives good Cheeſe, let him try it for Butter: if it yields that good in its Kind, and plentiful, let him fall upon that Branch: but if it be really poor, and will yield neither well, then let him take the moſt ſaleable Article, which we ſuppoſe to be Cheeſe, in the preſent Caſe, and make the beſt he can of his Milk that Way. If he cannot make ſuch as is of a ſuperior Kind, a worſer Sort will ſtill fetch a Price; and we have told him how much may be done by good Huſbandry, even out of the worſt Materials.

Let him examine what is the Cauſe of his Cheeſe being bad, and remedy it as well as he can; if not at once yet by Degrees, and that according to the Nature of the Fault. The firſt Thing he is to do is to get the worſt Weeds out of his Paſtures; and then let him, by the ſeveral Means we have laid down in the former Parts of this Work for improving of his Land, ſet about the Work of amending in earneſt. A little Expence will go a great Way in the Improvement of Paſture Grounds, if laid out with Diſcretion; and he will have the Satisfaction of every Day receiving more and more the Fruits of his Care and Expence in his Produce.

Having thus prepared the Farmer for getting over the greateſt Difficulties he can meet with in the Cheeſe Manufacture, we ſhall lead him to the Practice; and ſhall begin by explaining to him the Nature, and directing the proper Management of the Article he uſes for curdling his Milk, this is what is commonly called the Rennet, or Rennet Bag.

CHAP. XXIV.

Of Rennet or the Rennet Bag.

CHEESE, we have told the Farmer, is the curdy Part of Milk ſeparated from the reſt, at leaſt from the watery Matter, in which it is originally mixed in the natural State: the firſt Thing to be conſidered therefore is, how to get this Curd ſeparated. It is a Property of Milk that it will curdle with any Acid whatſoever: this curdling is the Separation whereof we ſpeak, it is the gathering together of the curdy or cheeſy Part ſeparate from the Whey.

As any Acid or ſour Matter whatſoever will anſwer this Purpoſe, the Farmer has his Choice of a great Variety, but finding nothing agree ſo well, in all Reſpects, with the Milk as Rennet, that is the only one he uſes. This is a very natural Preference, for moſt of the other Acids or ſour Liquors are either of mineral or vegetable Origin: of the firſt Sort are Spirit of Vitriol and the like, and of the latter Juice of Lemons and Vinegar; now Rennet being an Animal Acid naturally agrees better with an Animal Fluid, ſuch as Milk, than one of ſo different an Origin as any of the before-mentioned.

There is in the Stomachs of all Animals an Acid or ſour Juice: Nature has given them this to aſſiſt in the Digeſtion of their Food, and it is in various Degrees in different Animals; and in the ſame Animal alſo, at different Periods of its Life, according to its Degree of Health.

Of all theſe Acids of the Stomach of various Animals, there is none ſo gentle and ſo certain of always having an equal Degree of Strength as that of a ſucking Calf. This therefore is what the Farmer prefers to all others, and is what he calls his Rennet or Rennet Bag.

That he may always have it in Perfection, we ſhall tell him what is its proper Condition. The

Rennet Bag is properly the Stomach Bag of a young ſucking Calf, that never taſted any other Food but Milk, and where the Curd lies undigeſted.

In the Spring Seaſon let the Farmer recollect the Occaſion he ſhall have for theſe Bags, and get himſelf a ſufficient Store of them. And he muſt order and prepare them in this Manner.

Firſt let him open the Bag, and pour out the Curd and thick Subſtance into a Baſon, leaving the reſt that is not curdled in the Bag.

Then let the Curd in the Baſon be carefully examined and picked clean. There may be Specks of Dirt, Hair, or other Foulneſſes among it; theſe muſt be all taken out, and the Curd is then to be waſhed in cold Water ſeveral Times. By this Means it will become perfectly clean and white. When thus cleaned it muſt be laid on a clean Cloth to drain, and then put into a clean Diſh; in this it is to be ſprinkled well over with Salt, uſing a Handful or more to this Purpoſe, and with the Hand rubbing well in the Salt to every Part of the Curd.

When the Curd is in this Condition let it be covered from Duſt, and let the Bag be cleaned. This is to be done by waſhing it ſeveral Times over in cold Water. When it is perfectly clean let it be rubbed well with Salt, and then put in the Curd, which has been ſo well cleaned, with the Salt among it. Finally let the Outſide of the Bag be alſo well rubbed over with Salt.

There is a great deal of Nicety and Care to be uſed in this Preparation of the Rennet Bag, for on that depends its Value.

When a ſufficient Number are thus got ready, let them be all laid together in a Pot, and the Pot tied down carefully. Now the whole Work is done, except what is to be the Effect of Time. Theſe Bags will keep without any Danger of ſpoiling, and they are in their full Perfection a Year after the preparing them.

This is the right Preparation of Rennet, and a moſt ſurpriſing Thing it is that all this waſhing and cleaning cannot remove or get out the Acid of the Stomach from the Curd, but that it perfectly anſwers the Purpoſe of curdling the reſt of the Milk, whenever the Farmer pleaſes; and that in a Manner greatly preferable to any other that can be named.

Though the Rennet is beſt after a Year's keeping, it may be uſed freſh and new; but the Effect is not ſo good. The Curd gets its right Condition from the very Time of its being ſeparated by the Rennet; and a Fault at this Time is not to be remedied afterwards. When the Rennet is freſh, the Curd is not made ſo firm and ſtrong; and the Cheeſe never gets a good, firm, and even Conſiſtence; therefore it is better the Farmer purchaſe ſuch as are of a right Age, than uſe his own too ſoon.

The old Way of managing the Rennet Bag was, after a very ſlight cleaning, to hang it up to be ſmoak-dry'd in a Chimney-corner; but that is by no Means ſo good a Way as the ſalting and potting a Number of them together: it is neither ſo cleanly, nor does it keep the Rennet in the needful Degree of Strength.

We have ſhewn the Farmer the proper Way of preſerving his Rennet Bag, but there yet remains an Article very well worthy his ſtrict Notice and Attention; that is the ſeaſoning of it. This is to be done in the following Manner.

When the Bags have been kept a Year, let one of them be taken out of the Pot and opened. Let the Curd be emptied out into a very clean Marble Mortar, and have its wooden Peſtle alſo thoroughly and nicely clean: rub and grind it well by itſelf firſt; and then add to it the Yolks of three new laid Eggs, and half a Pint of fine rich and perfectly ſweet Cream; rub and grind theſe together, and when they are well mixed, dry before the Fire one Blade of Mace, one Clove, and about eight Grains of Saffron: when theſe are ſo dry that they will rub to Pieces, powder them in a ſmall Mortar and throw the Powder to the other Ingredients; then work all well together again, till it is ſo perfectly mixed as to appear but one Subſtance. When the whole is thus thoroughly blended let it be put up in the Bag again.

Then make a very ſtrong Brine of Salt and Water, by boiling them together; let this ſtand to ſettle, and ſtrain off the clear Liquor into a clean earthen Pan. Take about half a Gill of the Curd out of the Bag, and mix it with this Brine. This done cloſe up the Bag again, and hang it up with the Brine, putting in four or five Wall-nut Leaves.

The Rennet being thus perfectly prepared, is to be ſet by for a Fortnight, and will then be fit for Uſe.

We have here ſet down at large the Management of one Bag; and according to this the Farmer muſt dreſs all the reſt; and his Care muſt be to do them one after another, in ſuch Time as he ſhall want them; ſo that he may always have one under another, and may never be obliged to uſe any one that is not duly prepared, and that is not a full Fortnight old in the Brine.

Some uſe leſs Care than this in the preparing of their Rennet, but it is ſparing Trouble in a very wrong Article; for not only the Rennet is ſharper, and goes farther this Way than any other, but the very Goodneſs of the Cheeſe depends, in a great Meaſure, upon it.

Some on the contrary uſe more Care and Caution: thus it is not unuſual to add more Articles in the ſeaſoning: and others boil a handful of white Saxifrage, or ſome other Herb, in the Brine: there is little Harm in theſe Things, but they are needleſs. We are for delivering fully every neceſſary Article, and caution the Farmer ſtrictly and exactly to obſerve them all; but we would not load him with unneceſſary Trouble.

This is the needful Preparation for the makeing of Cheeſe in general, and we ſhall now proceed to the applying it to the ſeveral Kinds, according to the moſt ſucceſsful Manner of making them in thoſe Places which have been famous for them; and whence many of the Kinds are named, beginning with that Cheeſe which is, in a Manner, univerſal; and which is, when well made, very good every where.

CHAP.

CHAP. XXV.

Of new Milk Cheese.

NEW Milk Cheese, otherwise called Morning Milk Cheese, is a Kind of general Production of the Dairy, like fresh Butter. 'Tis made almost every where, and in most Places is very fine; but it must differ according to what we have said before of the Consequences of the Variation of Pasture; this, however, though it encreases or debases its Value, makes no Alteration in the Manner of preparing it, which is to be thus done.

In the Morning, toward the Time of the People's coming in with their Milk, let a clean and large Tub be set ready; and let the Milk brought in the Evening before, be very carefully skimmed.

Let the new Milk, warm as it is from the Cows, be strained through the Strainer we have before described, into this clean Tub, and then pour through the Strainer the Cream taken from the last Evening's Milk. This mixed with the new Milk will give it such a Richness, that the whole will often be equal to what is sold in LONDON, under the Name of Cream.

This is too rich alone, and therefore it is to be a little reduced, and at the same Time prepared for turning the better by some hot Water. This is to be poured in in such a Quantity as will serve to make the whole tolerably hot, which scalds the Cream.

When this is done the Business is to get it cold a little; to this End it must be moved about with a Dish, till it is no more than luke-warm.

It will now be in a Condition to receive the Rennet.

As to the Proportion of Rennet to Milk, that differs according to the Strength of the Rennet; but as we can very well determine the Strength of such as shall be made according to the Directions, we may be sufficiently exact on this Head. The Strength of the Rennet made thus is such, that a Spoonful is a very good Proportion for three Gallons of Milk; so that if the Quantity be one and twenty Gallons, the Farmer will know he is to put in seven Spoonfuls of Rennet, and in the same Proportion he is to use it, let the Quantity be what it will.

When the Farmer has computed, from his Quantity of Milk, how much Rennet he shall want, there will require some Care in the drawing it from the Bag. He must do this steadily and evenly, without stirring the Bag. When he has got the due Quantity out he must strain it very carefully into the Milk. Let him not wonder at our recommending so much Care in this Respect, for if the least Particle of the Curd of the Rennet fall into the Milk, it will be unseen among the Curd it brings on in the whole, and then mixing up with the rest in the making of the Cheese it will taint and corrupt the Spot where it is; and every one accustomed to this Commodity, knows how dangerous it is to get a corrupt Spot, it never fails to spread and taint farther.

When the Earning or Rennet is put in, the Vessel is to be covered, and all is to stand quiet for half an Hour. This is the Time needful for the Operation of turning the Milk, that is, for collecting the curdy Part separate from the Whey: at the End of the half Hour the Cover is to be taken off, and if it be not come, that is, if the proper Seperation be not made, it is not to be left longer for that Purpose, for the Expectation would be always fruitless, and the Loss of Time prejudicial; but more Rennet is to be put in. Beside the Difference of Strength in the Rennet itself, there is a very great Variety in Milk, some requiring more of the same Strength than other.

When the fresh Rennet is put in, the Vessel is to be covered up as before; and opened at Times to see the Effect. As soon as the Separation is well made, the Curd must be well toss'd and worked about in the Whey. The best Method of doing this is first with a shallow Bowl, and afterwards with the Hands.

The Bowl is to be used in rummaging and tossing it to and fro in the Whey; and when this has been done sometime, it is to be wrought and moulded, and worked together between the Hands, and then pressed forcibly down to the Bottom of the Tub.

The Curd being got to the Bottom, the Whey is to be skimmed off with a shallow Dish; and while this is doing the Cheese Fat is to be got ready to receive the Curd.

The Curd is to be lifted up with the Hands and broke, and pressed down into the Fat.

When the Fat is well filled, the Cheese Board is to be laid over it, and a small Weight put upon it. In this Condition it is to be left till all the Remainder of the Whey, not separated by the working in the Hands, is pressed gently from it.

When it has done dropping let the Housewife wet a large Cheese Cloth, and lay it over the Board, and then turn the Cheese upon it. Then she is to lay the Cloth into the Fat, and put the Cheese in again. She is now, with a thin Slice, to press down the Sides every where, then turning the Cloth over it, it is to be carried to the Press, and there pressed with a good Weight.

It is to be in its present Condition half an Hour in the Press; after which it is to be turned into a dry Cloth, and then put there again.

This Practice is to be repeated again every two Hours; each Time using a fresh dry Cloth; and it is to continue in the Press till the Evening of the next Day: only the last Time it is turned, it is to be put into the Fat without any Cloth at all.

When it is, after this, taken out of the Press, it must be put into a Tub, and rubbed on both Sides with Salt. There it is to remain all Night; and next Morning it is to be rubbed again with Salt, first on one Side and then on the other, and left upon the Brine which came from the first and the succeeding Saltings. When it has lain thus three Days it is to be taken out, and laid on a Shelf to dry; and while it is drying the Housewife must continue her Care of it, wiping it once every Day perfectly clean with a dry Cloth,

and then turn it on the dry Side; this is to be done every Day, till it be perfectly dry. At firſt it is fit the Cheeſe dry ſomewhat quicker than afterwards, which may eaſily be contrived by changing the Place.

This is the whole Proceſs that is to be followed in making the new Milk Cheeſe, we have been the more particular in deſcribing it, becauſe it will let the Reader into the general Manner of doing the reſt.

CHAP. XXVI.

Of a one Meal Cheeſe.

THE Farmer will know we mean, by a one Meal Cheeſe, ſuch as is made of the milking of one Morning or one Evening only; but the Morning is the proper Time, becauſe the Day is then before him for the Buſineſs. The Reader unaccuſtomed to theſe Things might ſuppoſe we mean a Cheeſe to be eaten at one Meal; but we muſt keep the accuſtomed Terms: all we can do is to explain them.

A one Meal Cheeſe might properly be called a new Milk Cheeſe, or a Morning Milk Cheeſe, rather than that laſt deſcribed, becauſe it is really made of new Milk only, or of the Morning Milk alone, whereas that has the Addition of the Evening's Cream; but we ſhall not be underſtood by thoſe for whoſe Sake we principally write, if we do not keep to the Uſe of thoſe Terms they are accuſtomed to hear.

The one Meal Cheeſe is made, we have obſerved already, of the Morning's Milk, and nothing more, and the Method of making it is the ſame with that before deſcribed, only that it is not ſo difficult in the firſt Part, becauſe there is nothing of that Trouble of mixing the Cream, and preparing the whole for the Rennet.

When a Cheeſe of this Kind is intended to be made, the Houſewife ſhould tell her Milk People of it, and give them a particular Caution to be quick Home with their Pails; for the moſt advantageous Way is, to mix in the Rennet when the Milk is warm from the Cow: it is in this Caſe to be ſtrained into a Tub, and the Rennet at once put to it in the Quantity before-mentioned. If the Milk be not warm when it is brought in, it muſt be ſet over the Fire to give it a little airing: but here a great deal of Caution is to be uſed, as to the Degree of Warmth: for a little Heat ſerves to make the Rennet take Effect, and the Curd ſeparates the ſooner for it, but on the other Hand, if the Milk be made too hot another Separation comes on, which is not intended in this Caſe, and this is the parting of the Cream from the Milk.

We ſee the Effect of heating Milk, whether in the common Way over the Fire, or in the Way for what is called ſcalded Butter, is always a raiſing of the Cream more freely and ſpeedily: now this is not intended in Milk deſigned for Cheeſe, for we ſee on the other Hand, a great deal of Cream is added to the Milk in the former Method of making the new Milk Cheeſe.

This is named to caution the Houſewife, that in following our Inſtructions for the Improvement of her Milk, ſhe may not, by exceeding the Bounds, ſpoil all. Some Warmth is neceſſary for the Rennet taking its proper and timely Effect, but too much ſeparates the Cream. We ſee that the Cream remains perfectly mixed in Milk as it comes from the Cow, and a leſs Warmth than this is ſufficient for the giving Effect to the Rennet; therefore let the Houſewife, whoſe Milk is not brought in warm enough, make it nearly as warm as when it comes from the Cow, it need not be quite ſo much, and while it is under this ſhe is ſafe from doing any Harm.

When the Milk has been made of a proper Warmth, and the Rennet is in, 'tis to be covered up till the Curd is formed; and then the Cheeſe is to be made, in all Particulars, juſt as that before deſcribed; that being the general Method, we ſhall in none of the following Inſtances repeat it, but only refer to it, unleſs when any particular Circumſtance requires ſome Variation.

Having mentioned what is called the one Meal, we muſt add the making of the two Meal Cheeſe; this is a Cheeſe made of two Milkings mixed together, and the common Way is to mix the Evening's and the next Morning Milkings for this Purpoſe.

In that Caſe the Cream is ſtirred into the Evening's Milk, and then the whole is mixed with the Morning's Milk: all this warmed a little together, till nearly as warm as the Milk when it comes from the Cow, and the Rennet is put to it, it is then to be covered up, and the whole to be managed into a Cheeſe as before.

There is another Sort of two Meal Cheeſe, which is made by mixing the Evening's Milk after it has been ſkimmed, with the Morning's entire, and this alſo is eaſily enough made into a Cheeſe, by firſt warming the whole over a Fire.

Theſe Cheeſes differ in Goodneſs according to the Quantity of Cream that is in them, and they are all, in their ſeveral Degrees, inferior to the new Milk Cheeſe deſcribed in the preceding Chapter. As that conſiſted of the Morning's Milk and Evening's Cream, it is the richeſt Cheeſe of this Kind. As to the others, the one Meal Cheeſe and the two Meal, are juſt equal in Goodneſs, when the Evening Milk is uſed with its Cream; but in this Caſe the Cheeſe is one Degree inferior to the other, as there the Cream of the Evening went to enrich the Milk of the Morning, without its own Milk. The third and pooreſt Kind is that made of the two Meals or Milkings, one of which has been ſkimmed. This reduces it toward the Condition of ſkim'd Milk Cheeſe; but however it is very ſuperior to what is made of ſkim'd Milk only, becauſe as that conſiſts of the Curd of Milk wholly, that had loſt its Cream, this is in Part compoſed of Curd with the Cream in the Milk, that of one Meal not having been ſkim'd. We ſhall add, for the Uſe of the poorer Farmer, and ſuch as have Occaſion for the moſt ordinary Cheeſe of all, the Manner of making it from Milk that has been ſkim'd entirely.

CHAP.

CHAP. XXVII.

Of ſkim Milk Cheeſe.

WE have come down gradually from the beſt Kind of common Cheeſe to this, which is the pooreſt and the worſt. It is to be made with ſome Care; and indeed the Ingredient is ſo poor, that without more Caution than is needful when there are better Materials, there will be no making it at all.

When the Milk of two or more Meals has been ſkim'd for Butter, it muſt be poured into a Tub, and the firſt Thing is to taſte it carefully, to find whether it begin to be ſour, for on this depends the Manner of working it; if the nice and accuſtomed Taſte of the Houſewife cannot perceive any thing ſour in it, ſhe muſt put a Part of it into a Pot, and ſet it over the Fire, making it ſo hot that it ſhall be able to heat the reſt thoroughly, to ſomewhat more than the Degree of Heat required in the preceding Directions.

In thoſe Caſes a richer Milk was uſed, ſo that there was Danger of raiſing and ſeparating the Cream by too much Heat; but here there is ſo little that it is in leſs Danger of that Accident; and the Milk being poorer, is not ſo eaſily turned. It will require ſomewhat more Earning and more Heat for that Purpoſe.

This is the Method to be followed, if the Milk be perfectly ſweet; but if on taſting it be found ſour, or but inclined plainly to Sourneſs, it muſt not be ſet on the Fire, leſt it ſhould break: in this Caſe a ſmall Quantity of Water is to be made thoroughly hot, and poured in to bring the whole to a due Degree of Warmth to receive the Rennet.

When the Rennet is in, the Veſſel is to be covered, and after this the whole Proceſs is to be repeated, till the Cheeſe is made in the ſame Manner as the former.

Theſe are the ſeveral Cheeſes made in common in all Places, and with which all Farmers ſhould be acquainted; we ſhall now come to ſuch as are more particular in their Kind, but moſt of them made to great Advantage.

CHAP. XXVIII.

Of Cheſhire Cheeſe.

THE Soil and Paſturage in Cheshire, and the adjacent Parts, are very favourable for Cheeſe; we have obſerved, on entering upon this Article, that ſome Soils and Paſtures are more, ſome leſs favourable, but none ſo much, at leaſt none more than this.

To this happy Article, which they have from Nature, the Cheshire People add a particular Care in the making up of their Cheeſes: otherwiſe there is not much particular in the Method, except what becomes needful from the great Size of the Cheeſe. We ſhall however lay down the whole Proceſs, as we have obtained it from ſome of the greateſt Dealers on the Spot; that the Farmer elſewhere, in the like Circumſtances, may know how to ſet about the ſame Undertaking.

Cheſhire Cheeſe is a new Milk Cheeſe of a very large Size, made from a Milk, which the Food of the Cows thereabouts renders particularly excellent for that Purpoſe. There is nothing more in the Matter, and the Way in which they make it we ſhall deliver preſently; but firſt, for the particular Inſtruction of the Farmer, we ſhall acquaint him with their general Management of their Cattle.

The Time of the Year at which they make their fine Cheeſe, is from the Beginning of May to the End of September: this they expect annually as the Seaſon, and they manage their Milch Cattle accordingly.

In the Middle of April they turn them out to Graſs, they make Cheeſes as ſoon as they begin this feeding, but the firſt are not the fine ſaleable Kinds, nor are brought to Market. They are coarſe, poor, and ill-taſted, and are all conſumed upon the Spot. The Paſtures are too rank at this ſhooting Seaſon of the Year, and the Conſequence is, that the Cheeſes made from their Milk partake of this Rankneſs, and they have it not only in their Taſte but in their other Qualities: far from being of that regular and firm Texture, the Cheeſes made afterwards have, theſe loſe their Shape, ſwell and become full of Holes, ſo that they are neither well taſted nor well looking. Nothing can be ſo unlike what we commonly underſtand by the Name of a Cheſhire Cheeſe, as what is made in Cheshire at this Time of the Year.

This may ſhew that the Effect really is owing to the Paſturage, in thoſe excellent Cheeſes we have from Cheshire; for we ſee, till the Paſture is come down from its own Rankneſs, it does not afford Milk fit for Cheeſe making there.

The People are ſo ſenſible they are to expect this, that they uſe particular Cautions always at that Seaſon: they always boil a Part of their Milk, which they do not at other Seaſons of the Year; but this does not anſwer their Purpoſe. However, as they are uſed to Cheeſe making they begin at this Seaſon, and ſo long as it is bad they keep it for their own Uſe; nothing could inform them ſo well as Experience, when it becomes better; and finally, when it gets altogether fit for their Service in the great Way of their Traffick.

Some have attributed this Fault in the Cheeſe made early in the Year in Cheshire, to ſome particular Weeds; and Horſemint has been named as the Principal; but this is a palpable Error. Horſemint grows all the Summer, ſo that were it the Cauſe the Effect would remain. The whole Occaſion is the particular Condition of the common Paſturage at that Seaſon. This in the reſt of the Year particularly favours the Cheeſe, but it is now too rank; and we very well know in other Inſtances, as well as this, the beſt Things may be faulty when they are in Exceſs.

It is not only before the right Seaſon, but after it, that the Cheeſe of Cheshire is bad; we have named the Time of the Year at which the fine

Cheeſe of this County is made, which laſts only five Months: after this Period, though the ſame Care and Pains be uſed in making it, the Cheeſe grows bad again, and is not marketable; at leaſt they do not carry it to Market, leſt it ſhould hurt the Credit of the Country: but they continue making it for ſome time, for the Uſe of their own People.

The Fault of the Cheeſe after MICHAELMAS, is of a very different Kind from that in Spring. In the Month of APRIL it is rank, and in OCTOBER it is poor. This is the greateſt Proof that can be, not only that the Excellence of the Cheeſe of this County is owing to the particular Nature of the Paſtures, but that this Article of Food to the Cattle is the whole Matter on which the Difference that good Dairywomen find in Cheeſe, in the ſeveral Parts of ENGLAND, depends. There is good Cheeſe made in SUFFOLK, and we ſee there is bad in CHESHIRE: but in general it is reaſonable to conclude, that the Soil of CHESHIRE affords a Paſturage particularly fit, and that of SUFFOLK particularly unfit for Cheeſe.

We ſee the Progreſs of the Growth of Paſturage in CHESHIRE, marked exactly by the Condition of their Cheeſe. During the Summer, when that Food is in its regular and perfect Richneſs, Cheeſes made there, though in the ſame Manner with thoſe in other Places, excel thoſe of any other Part of ENGLAND; but in Spring the Herbage is too rank, and they are deſtroyed by their own Richneſs, and in Autumn it is too weak, and the Cheeſes grow poor.

As the People of CHESHIRE begin Cheeſe making before the Paſturage comes to be good, they continue it after it is decay'd; and this with very good Reaſon, for they could not any Way elſe tell exactly when to begin, or juſt when to leave off. By this Conduct they do not loſe a Day of the Cheeſe Seaſon; and as to what they make before and after the Seaſon of its Perfection, they have a Home Conſumption.

When they are convinced there are no more of the marketable Cheeſes to be made, they continue that Work only till they have made the neceſſary Proviſion for Home; then they go to making of Butter, a great deal of which they ſalt, and this they continue till the Cows grow dry.

After this general Account of the Nature of Cheſhire Cheeſe, and the Occaſion of its particular Goodneſs, we ſhall give the Directions for attempting it in other Places, according to the Rules which are univerſally followed there; for in all the Country they have but one and the ſame Practice, and they very ſeldom fail in their Expectation, during the favourable Time of the Year.

CHAP. XXIX.

The Way in which Cheſhire Cheeſe is made.

IN laying down the general Methods of making Cheeſe in CHESHIRE, we muſt obſerve that there are in this, as in all other Things, ſome Differences; there are People in CHESHIRE who make poorer Cheeſes than others, but it is not to their Credit or Profit; and the Difference we obſerve in them, though in ſome Degree owing to the keeping, yet is alſo ſometimes owing to the Condition in which they come from the Maker.

We have obſerved that the Cheſhire Cheeſe is properly a new Milk Cheeſe. We have ſhewn, in the treating of the common Country Cheeſes, that ſome make them with new Milk, enriched by the Cream of the laſt Milking, and others of new Milk, impoveriſhed by an Addition of the ſkim'd Milk of a preceding Meal. In CHESHIRE their Paſtures are ſo rich that they never find it needful to enrich their new Milk, for it will alone, with proper Management, make Cheeſe of the richeſt Kind that can be; but ſome of the CHESHIRE People impoveriſh their new Milk, by mixing the ſkimmed Milk of a former Meal, and this always debaſes the Nature and Quality of the Product.

This is the general Cauſe of the natural Poorneſs of ſuch Cheſhire Cheeſe as is inferior to the common Sort; but this is a Practice carried on by few. Having juſt mentioned this for the Sake of paſſing upon it a neceſſary Cenſure, we ſhall lay down that Method which may be called univerſal in the County.

They are in the firſt Place particular as to the Condition of the Cow: and this is a Caution that all Farmers would do well to take from them: they find by Experience, in this great Cheeſe County, that the Milk of a Cow which has juſt calved, is not ſo proper as that a few Days after; therefore they never take the Milk of any Cow for Cheeſe till ſhe has been milked four or five Times.

This Caution being obſerved they uſe their whole Store of new Milk, a very little excepted, for their neceſſary Uſes, in the Cheeſe Manufacture. When the Morning's Milking is brought in, they ſtrain it warm into a large Tub, and put in their Rennet. Four Spoonfuls is the Quantity they uſually allow to as much Milk as will afford a Cheeſe of a Hundred Weight; and there are Dairies of ſuch Conſequence in that County, that they turn out two Cheeſes of about this Size every Day, during the five Months they are in the right Seaſon.

They cover up the Tub, and when it has ſtood half an Hour they open it, and find the Curd formed. They are very cautious to hit the right Quantity of Rennet, which no Rule can determine, becauſe of the Difference in the Strength: for too little does not give the Curd a due Conſiſtence, and too much makes the Cheeſe bitter.

After half an Hour they uncover the Tub, and preſs down the Curd with a large ſkimming Diſh; and when they have pretty well cleared off the Whey, they get to work upon the Curd with their Hands, which they break to Pieces in the moſt perfect Manner, working it a long Time for that Purpoſe.

This done, ſuppoſing it for a Hundred Weight Cheeſe, they add one Pound of Salt: this they work in, and mix thoroughly well with the Curd.

This done they put the Curd into a wet ſtrong

ſtrong and large Cheeſe-cloth, and when they have got the Whey tolerably well drained out, they put it into the Fat, or Mould, for four Hours, with a good Preſſure, putting the Fat in the Cheeſe Preſs, and working it down pretty ſtrongly.

At the End of the four Hours they take it out, ſalt the Outſides, put it into a freſh wet Cloth, and put it into the Fat, and that into the Preſs again: here it is to be kept four Hours more; and in the mean Time a Quantity of good ſtrong Brine is to be made of Salt and Water, and put into a large Tub.

When the Cheeſe has been four Hours more in the Preſs they take it out, and put it into the Tub of Brine, and then let it lie eight Days, all the Time covered over with Brine, and turned once a Day.

At the End of this Time it is to be taken out, and laid to harden and dry. This is to be done in a particular Manner, and Preparation is to be made for it accordingly.

A Quantity of Ruſhes are to be cut up, and laid green on a large Board: on theſe the Cheeſe is to be laid when taken out of the Brine, and for the firſt Day nothing is to be done to it; the next Morning it is to be turned and wiped with a Hair Cloth all over; and this is to be repeated every Day for twenty Days.

At the End of this Time it muſt be removed from the Bed of Ruſhes, and laid on the Floor; and it is here to be taken up, and turned once in three Days, and at every turning it is to be rubbed; till it gets firm and hard: as this is the compleating the Work, it is to be done very carefully; for if the due Degree of Hardneſs be not given at this Time, the Cheeſe will be liable to Accidents in the keeping. Therefore it is an eſſential Point to let it lie long enough, and wipe it carefully.

When it is thus finiſhed and hardned, the laſt Thing is the rubbing it over with ſome Butter, and this, though it may ſeem more trivial than the reſt, is very eſſential: half a Pound of Butter is the proper Quantity for a Cheeſe of a Hundred Weight, and this ſhould be rubbed thoroughly in all over it, nothing more tending to preſerve the Rind in good Condition, and keep the Cheeſe ſound.

This is the Method obſerved in that famous Cheeſe County. They have Rooms built on Purpoſe, in many Places, for the drying of their large Cheeſes, and they raiſe the Floors ſeveral Feet above the Ground, to preſerve them from Damp. In many Places they uſe Shelves put round theſe Rooms, inſtead of uſing the Floor, which I think much the better Method, for the Cheeſes are more ſecure to be out of the Reach of Damp, and they are more eaſily turned, and more conveniently rubbed and wiped, which is very eſſential.

CHAP. XXX.

Of making Cheeſe like Cheſhire, in other Places.

WHAT I have written in the preceding Chapter, concerning the making of Cheſhire Cheeſe, is what I have collected from thoſe who are much concerned in that Product, and from what I have myſelf ſeen on the Spot: for I once, ſome Years ſince, made a Journey thither for that Purpoſe, and took Notes of every Circumſtance, intending to attempt the makeing a Cheeſe of the ſame Sort.

Having thoroughly acquainted myſelf with the Method of working, I ſet about it at Home, employing the moſt careful Servants that could be had, and over-looking every thing myſelf.

The firſt Trial did not ſucceed; and I made another; after the ſecond I made a third, and being very much bent upon the Thing, I repeated the Experiment oftener than a wiſe Man ſhould have done; for I found in the End I had been trying to make Brick without Straw, my Materials not ſerving me.

I was not at that Time ſo ſenſible as I am ſince made by Experience, that the Cheshire Manufacture depends, in a Manner, entirely upon the Cheshire Paſtures. It was plain the Food was of great Conſequence, and from the Failure of the Milk from one Paſture I tried that of another, and went the Round of all my own, and ſeveral of my Neighbours, but nothing would do. Some was too rank, and ſome too poor, but none came up to that excellent Richneſs of the Cheshire Kind.

This I have mentioned as a Caution to others: but there is no Need it ſhould prevent their making ſome Trials, only let them learn from this Experience, not to venture ſo many.

There may be Grounds that will afford a proper Milk; but from ſuch as do not, none can ever make this right Kind of Cheeſe.

Wherever the Farmer has upon his Hands a rich, ſhort, and ſweet Graſs, with numerous Blades, a full Body in each, and few rank Weeds among it, there it will be worth while to make a Trial; not to ſet aſide the whole Buſineſs of his Dairy for ſuch Trial, but to make one Cheeſe. Let him give the Experiment fair Play, by makeing it in the firſt or ſecond Week in June, which is the Time when the very beſt Cheeſes are made in Cheshire; and having made this Trial with all due Care, according to the Rules we have laid down, if it do not ſucceed let him give up the Expectation: if it do he has the Opportunity of making a Fortune.

Others beſide myſelf have tried with as little Succeſs, in various Parts of the Kingdom; but all this proves is, that we have not yet found any Paſtures like thoſe of Cheshire; but that is no Proof we never ſhall.

The Misfortune of theſe Cheeſes made in the Cheshire Manner in other Places, is that they will not keep their Conſiſtence; and when that is loſt they ſoon decay. The great Happineſs of the Cheshire Paſtures is, that they furniſh a Milk which has at the ſame Time great Richneſs and great Firmneſs in the Curd, which are the two Articles whereon the Firmneſs and Fineneſs of Cheeſe depend.

CHAP.

CHAP. XXXI.

Of making Sheeps Milk Cheese.

THE Reader who is unacquainted with these Subjects, will naturally enough suppose a Cheese made of Sheeps Milk must be a very poor one: hut this is a great Error. They prefer in Cheshire the Cheese of the neighbouring Parts of Wales, to the very finest of their own, giving thirty per Cent. more for it, and this is all made of the Milk of Sheep.

It is particular in Sheeps Milk that it abounds in Curd; all Milk, as we have observed, consists of the three Parts, Curd, Butter, and the watery or wheyey Matter; but it is the particular Quality of the Sheeps Milk, that it affords most Curd in Proportion of any other Kind.

It is natural also to this Curd to be tender; but there are Pastures on which the Sheep yield a Milk as proper for Cheese, as the Cows of Cheshire. These are principally in and about the Borders of Wales. I have examined them with Design to tell the Farmer in England which of his own are like them, and I can give him some Hope of Success in this Article, if he will think it worth while to attempt the Manufacture.

Denbighshire is the particular County where Sheep Milk Cheese is fine: this is as famous as the Cheshire of England. The Pastures on which the Sheep feed there are hilly, the Soil rocky, and the Grass low, but very thick and entirely free from rank Weeds.

We have the same or very nearly the same Kind of Pasture in some Parts of Hertfordshire; and the Farmer will know it by the Shortness and dark Look of the Grass, and by the little blue Bell Flowers, which are the principal Weed that grows among it. In these Pastures Sheep yield a Milk, the Curd whereof is firm, and therefore there is all the Advantage, and little of the Inconvenience attending this Species.

The Cheeses made of this Milk are extreamly rich and mellow. They never have any great Degree of Hardness; but their Richness is always a great Recommendation, and another is their ripening very quick; for one of a moderate Size will be fit to eat in four Months or sooner.

This may very well tempt the English Farmer to make a Trial, and the Price may encourage him farther. 'Tis a Cheese that in many Parts of England brings from five Pence to seven Pence a Pound Retail; and might be set at a much larger Rate in London.

We shall acquaint the Farmer with the Method of making it to Perfection; but shall first inform him what he is to expect by Way of Quantity from these new-fashioned Milch Cattle.

Five Ewes, upon a good Pasture, will give at the Rate of two Gallons of Milk a Day: upon an indifferent one they will give a Gallon and half: so upon this the Farmer may judge how many he will set aside for this Purpose of milking. He may count five Ewes as the same with one Cow, and he will not be much mistaken.

The Sheep are to be milked Morning and Evening, and when they are a little used to it will stand very quietly. The Milk of the Evening is to be strained into that of the Morning, and when the Milkers come in the next Morning the whole is to be mixed with what they bring in. This is the Custom in Wales, where they make these Cheeses best; so that the Sheep Milk Kind is always what we call a three Meal Cheese.

When the Milk is all mixed, a little of it must be heated, and that poured into the rest to make the whole of the same Degree of Warmth with that which just comes from the Cow. Then the Rennet is to be strained in, and thoroughly mixed with it. As to the Quantity, it is to be about one fifth Part more than is used for Cows Milk.

The Vessel is to be covered, and stand quiet till the Curd is formed, and after that the Procedure is to be much the same with that on other Occasions. The Whey must be skimmed off, the Curd must be well worked in the Hands; and afterwards put into a wet Cloth and press'd, but this Pressure must be continued six Hours.

At the End of that Time it must be taken out, and the Cloth shifted; the Outside must be then salted, and it must be pressed six Hours more, the other Side being turned upwards.

While this is doing a Bed of Rushes must be made upon the Floor, and the Cheese, when taken out, must be laid upon it, and in this Manner it must lie a Fortnight, taking up and turning it every Day; and remembering every Time it is taken up, to rub it softly but thoroughly all over, with a dry and not very coarse Cloth. In this Time, drying gently and leisurely, it will get some considerable Firmness, for a Cheese of so mellow a Kind; and when it is thus far prepared, it is to be taken from the Floor and laid upon Shelves, where it will dry more quickly than at first, and be thoroughly finished.

This is the Method of making a Sheep Milk Cheese entire, and a very excellent and valuable Kind it is; but there may be a Sort made with Sheep and Cows Milk mixed, which will answer the Farmers Purpose excellently in many Places, where his Pasture would not serve for the makeing Cheese from the Sheeps Milk alone.

There is a Season when the Sheeps Milk may be had in Plenty, and without Inconvenience: this is when the Grass Lambs are sold off fat: the Ewes will then yield a large Quantity of Milk, and that regularly for some considerable Time; they should therefore be milked, and the Produce mixed with the Cow's Milk for Cheese. We have mentioned how Sheeps Milk abounds with Curd; and how fine that is in its Kind: being mixed with Cows Milk, the Curd produced from both has the Advantage of each Kind, it gets Firmness from the Cow, and a delicate Mellowness from the Sheep.

This Curd is to be made into Cheese in the Way we have described for the new Milk Cheese, and it will excel any that is made of new Milk from the Cow alone. I have had Cheese of this Kind made upon my own Ground,

and

and when it has come to my Table ſome have taken it for one Kind of foreign Cheeſe, ſome for another; and every impartial Perſon has declared it better than moſt Kinds.

CHAP. XXXII.

To make a Nettle Cheeſe.

A Nettle Cheeſe is accounted, in many Parts of ENGLAND, a very dainty and excellent Kind; it is a very thin new Milk Cheeſe, with an exceeding fine and ſmooth Coat, that is the whole Matter. It differs from the common new Milk Cheeſes more in the Form, and the Manner of making and drying, than in any thing eſſential in itſelf.

The Reader has obſerved that for the drying of the CHESHIRE Cheeſes, which are large and thick, they uſe a Bed of Ruſhes ſpread evenly upon the Ground or Floor of the Room; and in the ſame Manner a Bed of common Nettles is the Matter on which theſe Cheeſes are dried, and from which they receive their Name; the Nettles upon this Occaſion are to be freſh cut, as the Ruſhes on the other; and the Manner of making the Cheeſe is this.

Let the Milk of the Morning's milking be taken for this Purpoſe, juſt as it comes in warm from the Cows, without any Addition or Mixture, for the enriching or impoveriſhing it; or the joining with it the Milk of any former milking. Let this pure freſh Milk be ſtrained through the ſtraining Bowl into a large Pan, or ſmall Tub, and let there be immediately added to it as much Rennet as will be neceſſary to turn it. 'Tis then to be covered up half an Hour; then the Curd is to be preſs'd down, and the Whey ſkim'd off, and when thus ſeparated the Curd is to be wrought in the Hands. When it is well worked it is to be put into a Cheeſe Fat, not more than three Quarters of an Inch deep, and preſs'd to get out the Whey.

The very ſame Method is to be uſed that was directed for the new Milk Cheeſe, and by this Means there will be a very fine one Meal Cheeſe, thin and delicate, prepared, and ready for drying. It is then the Nettles come in Uſe. When it has been ſufficiently preſs'd it is to be laid on the Floor, which is to be firſt ſpread over with freſh Nettles, and another Parcel of the ſame is to be ſpread over it.

Care muſt be taken in the cutting and laying of theſe Nettles, for the Cheeſe is to have an even Coat, and that will depend entirely upon the Management in this Particluar. In the cuting then it muſt be obſerved, that only young Nettles are to be taken, or the tender Tops alone of ſuch as are more grown; and theſe, when they have been laid evenly upon the Floor, muſt be preſs'd down, and flatted carefully into an even and ſmooth Surface: this is the eſſential Article whereon the Smoothneſs of the Coat of the Cheeſe depends; and if there be any thicker Stalks, they will take Effect upon the tender Surface of it, and even any rumpled Leaf will have the ſame Conſequence. When the Bed is made flat and even, the Cheeſe is to be laid carefully upon it, and a Coat of the ſame Kind ſpread evenly over it. Every other Day freſh Nettles are to be brought in, and the Cheeſe is to be wiped and laid upon the new Parcel, covering it with freſh ones alſo. In this Manner it is to be kept till it is ripe and ready for the Table, and no Cheeſe ripens finer.

CHAP. XXXIII.

To make a running Cheeſe.

THIS is a greater Delicacy than the former, and is a richer Cheeſe, with the ſame Advantages of ripening; it is made thus. Mix together equal Meaſure of Stroakings of the Cow, and of rich Cream, put this in a clean Pan. Set it in a Pot of Water, that the Water may reach up on the Outſide as high as the Cream and Stroakings do within; then ſet the Pot on the Fire, till the whole be as warm as Milk from the Cow.

Take the Pan out of the Water, and put in as much Rennet as is ſufficient to turn it. Stir this well in, ſo that it may mix thoroughly, and then cover the Veſſel.

When it is come, preſs down the Curd, and take off the Whey: then heat the Whey ſcalding hot and throw it upon the Curds, and after this take up the Curd, which will now be in a Body: this muſt be done carefully with both Hands; and the Curd is to be raiſed up as whole as poſſible without breaking it, and ſo laid into the Fat; then place it in the Preſs, and put a ſmall Weight upon it; afterwards put on a larger, but don't bring it to the Screw Preſs, for it is too delicate for that forcible ſqueezing.

When the Whey is got out let it be taken out, ſalted a little, and laid upon a fine even Bed of Nettles. The Leaves of the Nettles ſtripped from their Stalks, ſhould be uſed for this Purpoſe. It muſt be ſhifted as the other, and will be very ripe in three Weeks or leſs. Three Pints of each of the Ingredienrs makes a proper ſized Cheeſe of this Kind.

CHAP. XXXIV.

Somerſetſhire Cheeſe.

THIS is a large and rich Kind of Cheeſe, named from the County whence it is brought, and where it is principally made. The Bigneſs is a very material Article, for I have ſeen the ſame Kind of Cheeſe exactly, made ſmaller, and it has been not at all particular, or ſcarce ſeemed of the Nature of the larger. What is farther ſingular in it is, that there is Butter worked into it, which greatly helps the Mellowneſs.

This is to be made thus. Let the Milk of twelve Cows be ſet over Night for Cream; and in the Morning let the Milk of the ſame Cows be brought into the Dairy warm from them. Let the Cream be carefully taken from the overnight's Milk, and mix'd with this Milk of the Morning, let all be ſtrained together into a

large Tub, and as much Rennet put in as will be ſufficient to turn it. Let it be covered up for half an Hour, then open it, break and preſs down the Curd; ſeparate the Whey, and when the Curd has been well worked in the Hands, to a Cheeſe of this Size there muſt be allowed three Pounds of freſh Butter. This muſt be well worked into the Curd with the Hands, and a little Salt ſprinkled over it, and alſo worked in.

It is then to be put into the Preſs in a large wet Cloth, and it muſt be turned very frequently, every Time uſing freſh wet Linnen, till toward the laſt, and then there muſt be three or four dry Cloths.

When it is put in for the laſt Time it muſt be ſomewhat firmer preſſed than before, and it ought to remain in the Preſs forty Hours. When it is taken out of the Preſs it muſt be waſhed over with Whey, and laid in Cloths till dried. It is finally to be laid on a Shelf, that it may dry perfectly, and there muſt be turned very frequently, and every Time carefully wiped. It will, according to its Size, take a conſiderable Time in drying, but it will become in the End a very rich and fine Cheeſe.

CHAP. XXXV.

Of the early Uſe of Wool in the Eaſtern Countries.

WE have ſhewn our Huſbandman the proper Management and various Uſes of Milk, the Produce of his Cows, and we are now to conſider the Nature, Qualities, and moſt advantageous Uſes of Wool afforded by his Sheep.

Wool has been conſidered at all Times as a moſt valuable Commodity; and that of our Country is preferable to moſt other upon the Earth. We find the Uſe of Wool known in the earlieſt Periods, and Flocks of Sheep are mentioned in the firſt Ages of Mankind, whether we read of them in Sacred or Profane Hiſtory. Kings and Lawgivers have not been aſhamed to employ themſelves in the Care of them; and therefore the Country Gentleman needs not think their Wool an Article beneath his Dignity. We wiſh to make a Regard to it more univerſal, and ſhall endeavour to render the whole Knowledge of it familiar.

We read in Sacred Hiſtory that the Patriarch ABRAHAM had Flocks, and the ISRAELITES of that early Time all employed themſelves in the Care of them: their Neighbours the MIDIANITES had ſuch Numbers at that early Period, that the ISRAELITES took among the Spoil after their Succeſs againſt them, more than ſix Hundred Thouſand; and drove to their own Lands: and two Hundred and fifty Thouſand were taken from the HAGARITES by the Sons of REUBEN.

The ETHIOPIANS had Sheep alſo; for when ASA conquered a Part of their Country, he carried away Sheep in Abundance: the ARABIANS at the ſame Period had alſo Sheep, for they brought more than ſeven Thouſand Rams at one Time to JEHOSAPHAT; and the MOABITES muſt have bred them alſo in great Quantity, for MESHA, King of that Country, rendered to the King of ISRAEL a hundred Thouſand Lambs, and a hundred Thouſand Rams.

Theſe are Paſſages of Hiſtory delivered in the ſeveral Parts of the Old Teſtament, according to the different Circumſtances that introduced them; and by theſe we find that at this remote Time, much earlier than the utmoſt Extent of any other Hiſtory, that the ISRAELITES had Sheep in great Abundance, and that the MIDIANITES and HAGARITES, the ÆTHIOPIANS and the ARABIANS, and the MOABITES fed them alſo in vaſt Quantities.

Here therefore is an Account of Sheep bred and tended in a Manner all over the Eaſtern Quarter of the World; and we have occaſional Mention alſo of the ſame Creatures making a chief Object of the Care, and a principal Article in the Riches of the AMALEKITES, the PHILISTINES, and the People of DAMASCUS.

Theſe are Countries whoſe Extent and Situation are very well laid down by the Labours of the Learned of later Time, and by this we ſee a great Part of the Quarter of the World, then moſt inhabited, devoted to the Care of this uſeful Animal.

That this Creature was bred not only for its Fleſh, which ſome have very idly pretended, is evident alſo from many Paſſages. The Mention of Wool is made in ſome of theſe, and in others there are Alluſions to the Implements of Weaving, which though they may be applied to either the weaving of Woollen or Linnen Cloth, yet as mention is in the ſame Books made of Wool, and of the Methods of preparing it for the Loom, they muſt be allowed often to refer to this Article.

That the ISRAELITES themſelves fed Sheep for the Wool, may be ſeen by the Tythe exacted on it. In the eighteenth Chapter of DEUTERONOMY, the firſt of the Fleece of the Sheep is declared the Due of the Prieſt: and that other Countries knew its Value in the ſame Manner, is plain from an Inſtance in the Preſent of the MOABITISH King before-named, which is, that the Rams were given with their Wool.

The Staff of GOLIAH's Spear is ſaid to be equal to a Weaver's Beam: the Fullers Field is mentioned in ISAIAH and by the Prophet MALACHI; and EZEKIEL, in the twenty-ſeventh Chapter, calls the People of DAMASCUS Merchants in white Wool.

We have recited theſe Paſſages, which contain the Summary of what is ſaid concerning Flocks of Sheep, their Wool and its Manufacture, in the Scriptures, to ſhew that the ſheering of Sheep, the Uſe of Wool, the manufacturing it into Cloth, and the preparing that Cloth by fulling, were Articles known in the earlieſt Time. It eſtabliſhes the Care of this Animal, and the Uſe of its Fleece, upon a very great Authority of antient Hiſtory; it produces Examples that may animate private Gentlemen to intereſt themſelves in the Care and Management of its Fleece, and Kings and Legiſlative Powers to eſtabliſh and encourage the Manufacture of it. This Attention both of private Perſons of Fortune, and of the Publick Authority and Regard, is greatly

wanting at preſent in ENGLAND, for the Advancement of our Woollen Manufactures.

It has been ſaid that GREAT BRITAIN and IRELAND naturally were the Reſources of the reſt of the World for Wool; but this has been a fond Miſtake, and has led the Publick into a Neglect of that Concern, from which it will not be eaſy to recover.

We have ſhewn here that Wool was produced in Abundance, and wrought into Cloth for common Service in the whole Eaſtern Part of the World, before any thing was known of BRITAIN; and we have found by Experience of late Time, that there are many other Countries in EUROPE which may rival us, if we neglect the Care, or our Legiſlature the Encouragement.

It is leading the Huſbandman into a falſe Calm, to make him imagine that the natural Quality of BRITISH Wool is ſo ſuperior to that of other Countries, that he may manage as he will, and it will ſtill have the Preference. Other Nations have been eminent in this Article before BRITAIN was attentive to it. We know not whether this Iſland was peopled at the Time of the earlieſt of the Tranſactions above-named, in which Wool is mentioned ſo importantly; and even long after, when the enterpriſing Genius of the PHÆNICIANS puſhed their Navigation and their Traffick hither, this Commodity was not known amongſt our People.

They traded hither for Tin, which they purchaſed on the SCILLY Iſlands near the Land's End in CORNWAL, then called the CASSITERIDES; and as they came hither on that Account, they took of thoſe early BRITAINS alſo all that they had to offer in Commerce. The ſeveral Articles are named, and Wool is not of the Number. STRABO has committed to Poſterity the different Commodities: they were beſide Tin, the great Article which brought thoſe remote People hither, Lead, Corn, Cattle, Gold and Silver, alſo Dogs of a particular Breed, the old and famous ENGLISH Bull Dogs; and what comes neareſt the preſent Article, Hides. Theſe were the ſeveral Articles furniſhed by the BRITONS, and we ſee they had a Market for whatever was the Produce or Manufacture of their Country, but they never brought Wool to the Traders, though they ſold them Hides. Therefore we ſee that BRITIAN, far from having at all Times ſupplied other Nations with Wool, was a Country that late fell into that Concern; and that there were Manufactures of Woollen in the Eaſtern Countries, and probably in many others, before the Uſe of the Fleece appears to have been known in this Iſland.

This is not wonderful, becauſe the Inhabitants of a great Part of the Kingdom went naked, and thoſe who covered themſelves with any thing uſed the Skins of Beaſts, in a rough and ſavage Manner.

As we have here ſhewn from Sacred Hiſtory, that this was the State of the Caſe, we ſhall, in the ſucceeding Chapter, ſhew it appears alſo in the ſame Light from other Authorities; and from that we ſhall deduce the Leſſon of Induſtry, Care, and Application to the Affair of Wool, for the Service of all concerned, from the meaneſt Farmer to the Sovereign. It appears that other Nations were acquainted with this valuable Commodity before it was known in BRITAIN: they may therefore ſupplant us in all Places, as they have in many, in this Article.

Our Huſbandman has it in his Power to raiſe his Woollen Manufactures, under the Encouragement of the Government, to a greater Perfection than other Nations: this is the Advantage of our Country, let us not ſuppoſe we have more than we have, but knowing the true State and Limits of our Pretenſions, let us uſe every Method to improve them.

CHAP. XXXVI.

Of the early Uſe of Wool in other Countries, according to general Hiſtory.

ALL the old Hiſtorians mention the Care of Flocks, and Value of their Wool; the GREEKS, of all the Periods we know, uſed it for the Purpoſes of Cloathing, and they refer to Times much earlier than their own, as familiar in the ſame Uſe; the famous TYRIAN Purple was employed in dying woollen Cloth; and the early Expedition of the ARGONAUTS to COLCHIS, for what was called the Golden Fleece, however it have been repreſented, was no more than a Voyage of Traffick in Search of this Commodity. The Naturaliſts may ſuppoſe their Voyage was in Search of Gold, and the Adepts pretend that the Secret of the Philoſopher's Stone was couched under this Myſtery: but plain Reaſon, and the moſt authentick Accounts of the Tranſaction, taken in their plaineſt Senſe, ſay nothing more than this; that the People of COLCHIS underſtood the Management of Sheep, and the manufacturing of their Wool, better than any other Nation of that Time; and that JASON, and his Partners, in that Expedition, after encountering many Dangers at Sea, and in their firſt Intercourſe with them, brought back a Quantity of the Wool, and a Number of the Natives to manage the ſame important Article in their Country.

The City of CORINTH became afterwards a general Mart for Wool and woollen Manufactures, and therefore all Commodities in general: and after POMPEY had ſcattered the Pirates, the ſame Article was a very conſiderable Branch of the Commerce carried along the Coaſts of the Mediterranean Sea.

In all theſe Ages, while ſo conſiderable a Traffick was carried on with Wool and woollen Cloths, in the ſeveral Countries we have named, nothing was known of BRITAIN. The Knowledge the PHÆNICIANS had of our Country was loſt; and they had never communicated it to any other People. This Iſland ſubſiſted as a Place ſeparated from the whole World, and unknown to all its Inhabitants; and the Hiſtories, ſuch as they are, that give an Account of BRUTE the TROJAN, and his Deſcendants, their Wars and Victories, mention not a Word of this important Article.

Our Anceſtors, ſomewhat more civilized in thoſe Ages than they had been in the preceding, might, for ought we know, have begun to manufacture

nufacture Wool: that they might do ſo is all that can be alledged, we do not know they did; and of this we are very certain, which is the main Point concerned in this Place, that if they had the Knowledge of it, they ſerved none but themſelves; they had in theſe Ages no Commerce with the reſt of the World: that was ſupplied one Country by another; and we ſee abundantly the Error of thoſe who fancy this Iſland the natural Source of that Commodity.

We not only know that other different Kingdoms at that Time were famous for their Production and Manufacture of Wool, but we are told of ſeveral of them by Name. The ſame accurate and faithful Writers who give an Account of the Commodities of BRITAIN in thoſe early Times, and do not name Wool among them, name that Article as a very valuable and firſt Rate Commodity in reſpect of others. SPAIN is mentioned with great Commendation, in reſpect of the Wool it produced in thoſe early Times, and the Manufactures made from it: inſomuch that ſome attribute the Invention of weaving woollen Cloth to the People of that Nation. Wool was received in the early Times from many Parts of the Euxine; and the Trade of the Baltick was, in a great Meaſure, ſupported by it. The ARMENIANS of the ſame Period purchaſed Wool and woollen Cloths of the TURKS, in Exchange for Horſes. ROME in ſomewhat later Times, received woollen Manufactures from ALEXANDRIA. This all ſtands eſtabliſhed on the beſt Authorities; and is related by all the Authors who have, in any Part of their Works, had Occaſion to mention the Commerce of thoſe early Ages. In all theſe Times BRITAIN continued negligent of this Matter, as is evident from the Silence of all thoſe who mention the woollen Trade of other Nations, among the moſt conſiderable Articles of their Commerce; and ſay nothing of it in reſpect of this, when they treat of the Products of it, and the Traffick carried on by them.

It will be ſeen, in the ſucceeding Part of this Work, how valuable a Part of our natural Advantage we neglected in this Article; and we ſhall, I hope, be cautioned not again to loſe ſo great a Benefit, which ſo many others have, at different Times, taken from us, and will always be ready to take from us again, if our own Affiduity, and due Support from the Government do not prevent them.

CHAP. XXXVII.

Of the Wool of different Parts of the World; its Condition and Qualities.

IN the Countries that lie far North, the Wool is generally coarſe, and of little Value.

In ICELAND it is as coarſe as Hair, and in ſmall Quantity. In NORWAY the Wool in general is but poor, though there is ſome tolerably good; that of their natural Sheep is ſhort and coarſe, and ſuch as they bring over from other Places often die in the hard Winters. They work it up into Manufactures at Home, but they are of the pooreſt Kinds: their Cloth is little better than Flannel, and the principal Uſe of it beſide is in a coarſe Kind of knit Stockings, which they not only make for themſelves, but for Exportation to the other Northern Countries, to the Amount of ſixty Thouſand Pairs a Year.

In SWEDEN the Wool is alſo very coarſe, ſhort, and poor: they have been uſed, till of late, to have their woollen Goods from us, but they have ſince encouraged Manufactures ſo far, that they have a coarſe Cloth of their own Fabrick, and to promote the Care of this Branch of their own Trade, a Duty is laid on the ENGLISH.

In MUSCOVY they have Abundance of Sheep, but their Wool is not fine.

In POLAND they have ſome Wool, but it is not excellent.

GERMANY, in many Parts, abounds in Sheep, and their Wool is fine, and the People underſtand very well how to make the beſt Advantage of it.

In the AUSTRIAN NETHERLANDS there is Abundance of fine Wool, and many of the woollen Manufactures have been either invented or improved to a great Height there.

FRANCE is not famous for its Wool, though ſome in the Southern Provinces is very fine, but they import a great deal, and to our great Diſadvantage, from ENGLAND, among other Places; working up our own Produce to ſupply other Markets in our Stead.

SPAIN produces a good Quantity of Wool, and it is the fineſt in the World: we err in ſuppoſing that of our own Country excels all others, this is an Inſtance of the Error, and there are ſeveral others.

PORTUGAL has Wool alſo little inferior to the SPANISH: it is fine and delicate, and fit for the niceſt Works.

ITALY affords ſo much Wool that a great deal is annually exported, and it is very good: the VICENTINE and PARMA in particular are famous for a fine and valuable Kind.

In HUNGARY and TRANSILVANIA there is a great deal of Wool produced, though not of any particular Excellence, ſo that it is leſs ſought by Strangers, and in general it is worked up at Home.

In TURKEY they have Abundance of Sheep, and they carry on a conſiderable Traffick in Wool.

In SCOTLAND a great deal of good Wool is produced, though not equal to that of ENGLAND. In GALLWAY, TWEDALE, and more North, they have what is very fine, and they underſtand it very well. They had the Art of making Broad Cloth in great Perfection before the Union. The GLASGOW Plads exceed all other Manufactures of that Kind; and they have many other very good ones. There is a Method in the dying the red Part of theſe Manufactures, which the SCOTS have the Addreſs to keep to themſelves, and which keeps them the Pre-eminence in that Manufacture, though all the Arts poſſible have been uſed by our People to diſcover or purchaſe the Secret. The SCOTS are more honeſt than our People of the ſame Rank; it would not have been eaſy to have kept a Secret of that Importance in ENGLAND, which was neceſſarily entruſted to ſo many People.

In the East they at preſent leſs regard the Produce of this Commodity; becauſe their principal Manufacture are in Silks and Cottons, but there is a great deal of very fine Wool in ASIA, SYRIA, and PERSIA. They have a particular Breed of Sheep in this laſt-named Country, whoſe Wool is long and greyiſh, and they make certain peculiar Manufactures of it, and thoſe much eſteemed.

In CHINA and the EAST-INDIES the Produce of Wool is ſo great, that they ſhear their Sheep three Times a Year: and in AMERICA they feed Abundance of Sheep, whoſe Wool, in many Parts, is little inferior to that of our own Country.

CHAP. XXXVIII.

Of the Methods of managing Wool in different Parts of EUROPE.

THE FRENCH, who very well know where the beſt Wool is to be had, get what they can from ENGLAND, not a little from SPAIN, and purchaſe it wherever good is to be had in other Places. The foreign, as well as their own, they divide into ſeparate Parcels, according to the Degrees of Goodneſs, before they work it up or diſpoſe of it. Moſt other Countries have the ſame Practice, and from their dividing it into three Kinds this is called the Triage of Wool.

Theſe three Kinds are called, in all the modern Languages, the firſt, the ſecond, the third Kind of Wools. And when the Fleece is ſold entire, there is uſually made a Diſtinction, according to its Quality, into a firſt or a ſecond Kind: the fine and the coarſe being diſtinguiſhed by theſe Names.

The Proprietor has his Choice to ſell his Wool in the Groſs, as it is ſhorn, or to clean and ſeparate it; and in general the beſt Method is to manage every Commodity as well, and work it as far as the Knowledge or Convenience of the Huſbandman will permit; for thoſe who buy Things in the Rough, as they call it, always make themſelves large Allowances for Waſte and Labour in the working. In many Articles the Difference between ſelling the Produce in this rough Way, and ſelling it wrought, ſo far as the Farmer can conveniently do it, is Thirty per Cent.

The Wool of SPAIN is principally from CASTILE, ARRAGON, and NAVARRE, and of theſe the firſt is generally the fineſt. It makes an admirable Mixture with our ENGLISH Wools. Thoſe of FRANCE are, by all Acknowledgement, greatly inferior to ours; yet they by a proper Mixture of the SPANISH, and a good Fabrick, have produced Cloths very little inferior to our own, when we have kept our Wool entirely from them. Our People ſhould in this learn from their Neighbour's Policy.

In SPAIN, where they are very choice of their fine Wool, they have five different Ways of ſelling it; and the ENGLISH Farmer ſhould obſerve the Difference for his own Information. They ſell it, ſometimes ſingly on the Sheep's Back; ſecondly, Coarſe as ſhorn; thirdly, Waſhed and cleaned; fourthly, Waſh'd, cleaned, and triaged; that is, ſeparated into the fineſt, ſecond, and coarſer Kind; and fifthly, On the Sheep's Back at a general Price, to pay for one Pile what other Piles of the ſame Quality ſhall be ſold for. They generally find the fourth Way the beſt for the Seller, and the fifth the beſt for the Buyer. 'Twas once a Cuſtom in ENGLAND to ſell the Wool in this Way, but our Farmers are grown wiſer, and we hope they will continue to be ſo.

The Difference in Quantity between the Wool as it is ſhorn, and when waſhed and cleaned, is about one half: ſometimes the Waſte is a little leſs, ſometimes a little more, but uſually about this. The ſecond Cleaning, which prepares them abſolutely for Cloth, reduces them near a fifth; and this is the whole Waſte in general Terms.

This will inform the Farmer upon what general Conditions he may ſet the Price of his Wool, if he chuſe to part with it rough, but it will in this, and all other Articles, always be his Intereſt to work them as far as he can himſelf: this is ſo univerſal, that he ſhould underſtand it as repeated under every Article.

Upon the whole, having looked into the Produce of the Wool of different Countries, we ſhall do well to conſider the Nature of their Paſturage, and other accidental Things of every Kind, that the Farmer may ſee not only where the beſt Wool is produced, but form ſome rational Gueſs to what the Excellence is owing.

In general two Things contribute to the Fineneſs of Wool, the Sweetneſs of the Paſture and the Cleanlineſs of keeping.

In SPAIN, where the Wool is excellent, the Grounds are in a Manner barren, in Compariſon of thoſe in many other Countries, and in many of the Northern Nations we have mentioned, as producing indifferent Wool, the Meadows are covered with a very rich Graſs: but then the little Graſs of SPAIN is ſweet, and this abundant Quantity of the Northern Kingdoms is harſh and ſour. A coarſe Graſs makes a coarſe Wool; and to this we may attribute the ill Succeſs of thoſe ſeveral Schemes which have been practiſed, of carrying the Sheep of Wool Countries into others not famous for that Produce; the Kind is not of ſo much Importance in this Matter, as the Nouriſhment; and the ſame Sheep in a ſweet Paſture will yield the fineſt Wool, that will afford but indifferent on a coarſer Graſs.

The practical Rule to be drawn from this is, that the Farmer who has a Mind to raiſe the Credit and Price of his Wool, ſhould firſt chuſe a proper Breed, which we have ſufficiently directed under the Article of Sheep, and then feed them principally, if not entirely, upon his ſweet high Paſture Grounds.

Cleanlyneſs is the next Article, and this follows the other in Courſe, for the Sheep on Downs are always much cleaner than thoſe in low Grounds. The FRENCH cannot be ſo careful in this Reſpect as we may, becauſe the Fear of Wolves renders it neceſſary for them to houſe their Sheep in Winter; and in this Caſe there is no Poſſibility of their living ſo ſweet and clean, as when they went on in an open Paſture, and

touch nothing but the Graſs waſhed with the Dews of Heaven.

Our covered Fold for raiſing Manure from the Dung and Urine of Sheep, will be little Diſadvantage to their Wool, if the Earth thrown into it be of a ſandy or dry loamy Kind, and none anſwers that Purpoſe better.

CHAP. XXXIX.

Of the Origin of the Woollen Trade of England.

WE have ſeen how late, in Compariſon of other Nations, the People of Britain fell into the Care of Wool, and the manufactureing of it; and we ſhall find, upon farther Enquiry, that by all we have remaining on the Subject, the Progreſs made in it was at firſt very ſlow.

This is the more to be lamented becauſe we have, and always had, the fineſt Paſtures in the World. The improved State of Huſbandry has, from time to time, brought in new Advantages to tilled Land, and none more than the lateſt; but at all Times the Paſturage muſt have had its Character of Excellence and Superiority, nay probably in the Times when Agriculture was leaſt improved, that Part of our Produce was beſt, becauſe then the beſt Lands lay for it. Graſs is a Product of Nature, in which ſhe needs no Aſſiſtance from the Hand of the Labourer, or Genius of the Huſbandman: her own Hand plants the Growth, and the Rains of Heaven are all it needs for bringing it to Perfection.

There never was any Time therefore in which this Country wanted the Means of feeding Sheep, and conſequently there has been no Time when it might not have produced Wool in Abundance: we have the ſame Advantage over all other Countries in the World, at this Time, in reſpect of our Paſtures: and let the Huſbandman well regard it. Let him remember how many Ages other Nations, as we have ſhewn him in the preceding Chapters, ran away with the Profit of this great Commodity, before his Anceſtors in this Iſland thought of intereſting themſelves in its Concern; and let him recollect later Inſtances in which they have, and in which, I am ſorry to ſay, they do rival us through our Neglect: what Advantage they had before the Britons entered on the Trade they may have again, if it be neglected on one Hand, or reſtrained by Authority on the other: and let theſe Conſiderations have their Effect in the ſtirring up all Ranks to promote and patronize it.

If we would know by what ſlow Degrees the Care of Wool, and the Profits riſing from it, became known in England, we muſt refer to thoſe Records in which it has been occaſionally named, or in which any thing concerning Sheep is to be found; for we are not to expect that we ſhall, in any early Time, find an Account of a Trade eſtabliſhed on this Article.

We have ſhewn that the Generality of our Anceſtors, in early Time, went naked, and that Skins were the Covering of the reſt; in the Time of the Romans Commerce became more eſtabliſhed in this Iſland; and London was a Place of great Traffick: but Wool was not of the Number of the Articles in which either our own People, or the Romans ſettled among them, traded.

One of the earlieſt Notices we have of Sheep in Britain, conſidered with reſpect of their Value is found in Stillingfleet *, who tells us, That between the Years ſeven Hundred and twelve, and ſeven Hundred and twenty-ſeven, were made certain Laws of King Ina, and in thoſe a Value or Price was ſet upon the Sheep Kind. The Price of an Ewe and her Lamb together, till a Fortnight after Easter, is there ſet down at One Shilling. The Value of Money was then very different from what it is now, but this, with all the Allowances that can be made on that Head, is but a very poor Price.

* *Chronicon Pretioſum*, p. 20.

We may learn by it that in King Ina's Time the Care of Sheep was grown to ſome Concern in the Iſland; and there are other Paſſages of the ſame Period, that ſhew Wool was an Article compriſed in the Purchaſe of theſe Creatures; but by all we learn on this Head, the Art of working it was but at a poor Height; nor was any of it exported either wrought or raw.

Alfred, a Name famous for Military Atchievements, and alſo for the Care of Arts and Commerce, took no ſmall Pains to improve this Manufacture; but they did not much ſucceed; 'twas in the Year 885, he ſet in earneſt about this great Work, but Wolves were too numerous in the Iſland to let Sheep be kept in Safety.

The Conſequences of the Encouragement this Sovereign gave to the raiſing theſe Animals, was ſeen in the ſucceeding Years; for in 918, Edward, who had married the Daughter of a Country Gentleman, diſtinguiſhed by the Regard he had ſhewn to this great Concern, and thence called by thoſe who little underſtood what they read in earlier Writers, a Shepherd, had his own Daughters inſtructed in the Art of carding, ſpinning, and manufacturing Wool.

This double Patronage beſtowed by Edward, the Countenance he gave to one who employed himſelf in breeding Sheep, and the Example he ſet in making his Daughters work the Wool, was of ſo much Aſſiſtance to the Manufacture, that the Paſturage of the Southern Countries became moſtly occupied in feeding Sheep, and every one, fond of recommending himſelf to the Royal Favour, became a Shepherd, or at leaſt employed his Attention greatly on that Article.

The Wolves were for ſome time the principal Obſtacle to the Progreſs of this great Undertaking; but after many Struggles with this Inconvenience, Edgar, about the Year 961. ſetting a Price upon their Heads, and by every other Means encouraging their Deſtruction, three or four Years did the Buſineſs: there was not in that Time a Wolf left in the Kingdom.

The Value of the Sheep roſe in Proportion to the Number propagated and preſerved: for with the Encreaſe in the Quantity of Wool, the Number of Manufacturers encreaſed, and the Demand for it enlarged. The ſame Author who tells us that in 720. in the Time of Ina, an Ewe and her Lamb together, were valued only at a

Shilling

Shilling in the beſt Seaſon, ſhews us that in 1000. under the Reign of ETHELRED, a Sheep alone was worth a Shilling, without any Reſtraint of Seaſon †. This Shilling was SAXON Money.

† *Chron. Pretioſum*, p. 81.

This ſhews that the Value of Sheep roſe, but it alſo ſhews that it was but ſlowly. No Exportation of Wool, or woollen Cloth, is yet heard of in the Market at Home; and People principally wrought up the Produce for the Service of their own Families.

A Hundred Years after we find by an accidental Paſſage, that the Value of Sheep was rather decreaſed than encreaſed, ſo that we may ſee the working up the Wool did not thrive very faſt. The black Book which contained the Taxation of every Man, toward the Support of the King's Houſhald, there mentions Money as an Equivalent for Cattle, and the Sum on each Article is ſtated. Ten Years before this Time we find, that if a Sheep was loſt the Damage was eſtimated at Five-pence, but on this Occaſion the Price laid upon him who choſe to pay his Tax in Money, inſtead of Cattle, was only Four-pence in the Place of One Sheep.

Purſuing this Subject in the old Records, we find the Sheep more numerous in all the ſucceeding Reigns, and we ſee their Value encreaſing conſtantly with their Number. In the Time of HENRY the Firſt, about the Year one Thouſand one Hundred and Twenty, forty Sheep were valued at One Pound.

In one Thouſand one Hundred and Eighty-five an antient Record tells us, that by the Cuſtom of BELESHAL, the Tenants of SHERBORN were, on certain Occaſions, to make their Acknowledgement by delivering a Ram, but if they choſe to pay in Money, the Price was fixed at Eight-pence.

The Reader is not to imagine that this Price eſtabliſhed upon Sheep, had Regard to their Fleſh for Food, without Reſpect to the Wool: it is true that all Hiſtorians are ſilent upon the Progreſs of that Commodity and its Manufactures, but we have, a few Years thereafter, a memorable Inſtance of the Regard ſhewn to it as a National Commodity.

RICHARD the Firſt, in the Year one Thouſand one Hundred Ninety-three, returning from the Holy War, was taken Priſoner by the Duke of AUSTRIA. A vaſt Ranſom was required, and toward raiſing it one Year's Wool was demanded from two of our Abbeys. This is a Paſſage recorded by RAPIN †, and all the common Hiſtorians, and is ſupported on the beſt Authorities: and this ſhews, though we have not had any regular Account tranſmitted to us of the Progreſs of this Article of Commerce, that all the Time the Price of Sheep was encreaſing the Value of Wool was riſing, and that this was the principal Cauſe of their Encreaſe in Value: and we find that at this Period Wool was become the firſt Commodity of the Iſland: the Thing next named in Purchaſes to Money.

† *Rapin's Hiſt. of Eng.* v. 1. p. 254.

Till this Time we hear, as I have before-obſerved, nothing of any Uſe of Wool, except for our Home Conſumption, but this Tranſaction ſeems to have opened the Eyes of the neighbouring Nations. Having received ENGLISH Wool in Payment they found it excellent, and they began to think of it as a Purchaſe. The Paſtures of BRITAIN now ſhewed the World their Excellence for the feeding this uſeful Animal, and the Huſbandmen began to acquire a Reputation for its Management. Exportation of Wool became a common Practice, and the Article from this Time grew ſo important, that it was the great Source on all Emergencies. It was the Land Tax and the Malt Bill of thoſe early Periods.

The firſt Notice of its Exportation is in the Year one Thouſand one Hundred and Ninety-eight, only five Years from the Time of RICHARD's Ranſom.

In this Year we find, in MADDOX's Hiſtory of the Exchequer, that GERVASE DE ALDERMANBURY ‡, rendering an Account of the Chamberlainſhip of LONDON, gives in this ſingular and important Article: Fines from Merchants for Permiſſion to export Wool and Leather Twenty-three Pounds twelve Shillings.

‡ *Maddock's Hiſt. of the Exchequer*, p. 532.

At the ſame Time that Quantities of Wool began to be exported, the manufacturing of it at Home encreaſed. The ſame Exchequer Account gives a Liſt of ſeveral Sums by the Sale of Wool at Home; of twenty Pounds from one Perſon, and of two Hundred and Twenty-five Marks from the Seizure of a Quantity that was attempted to be ſmuggled out of the Kingdom, or exported without paying the Fine for Leave.

This is an Article recorded in the ſame Author, and it tends very happily to the ſhewing the real Price of Wool in ENGLAND at that Time.

The Quantity of Wool ſeized on this Occaſion was forty-five Sacks. Each Sack we find was valued at five Marks, and each Sack contained twenty-ſix Stone of Wool. This ſettles the Price of Wool in ENGLAND, in the latter Part of the Reign of RICHARD the Firſt, at little more than Two and Six-pence a Stone. This Two and Six-pence was, at that Time, one Eighth of a Pound Silver, and was equal to about three Times that Quantity or Weight of Silver now; that is, to ſeven Shillings and Six-pence.

The Reader will, we hope, not blame us for deſcending to Particulars in a Point of this Curioſity and Importance. We ſhall endeavour to trace the Hiſtory of this Commodity from the beſt Records of earlier Time, and ſhew him its Advances and Decline under the different Encouragements or Oppreſſions of its Manufacture.

About thirty Years after the ENGLISH found the Way of ſerving their Neighbours with our Wool, we improved ſo far in our own Manufactures of it, as to get into the Art of dying. At firſt Wool was only wrought up in a coarſe plain Way for the Cloathing of the Farmer and his Family: by Degrees thoſe who beſt underſtood the working of it up, brought what they had to ſpare from the Service of their Family to Market; but all this Time the Wool was only wrought up as it was furniſhed by the Sheep, and all Cloth was of the ſame Colour.

They found that thoſe who imported Wool and woollen Cloth from us, in its natural Colour, dy'd it at Home; and they ſoon learned the Art of doing the ſame here. We read in the Sta-

tute Book, that in the ninth Year of Henry the Third, dy'd Cloth was limited by a certain Law, as to its Quantity and Measure.

Our Wars with France, and other Difficulties, broke in upon the Progress of our National Trade in 1242. the Persons and Effects of the English Merchants in France, and those of the French Merchants in England, were seized in Consequence of Hostilities between the two Nations; and in 1275. all Commerce was prohibited between England and Flanders, upon a like Account; but upon this Occasion we find an Instance of the great Height to which the Wool Trade of Egnland was arrived at that Time, for a few Flemish Merchants were permitted to carry over a Quantity of English Wool with them, paying the King for the Permission. This Quantity was no less than a Thousand and Sixty-eight Sacks, and the Price for Leave of Exportation was ten Shillings a Sack. We see by this how swift a Progress the Commerce of the Kingdom, in this Article, had made, when the Husbandmen understood the Value of the Commodity; and the Legislature encouraged its Manufacture.

We find by the Accounts here given, how little Historians and others have considered this important Article. Those who speak of the Manufacture of Broad Cloths in England, follow one another in placing the Time of their being first made at the Year 1331. We see from this Circumstance, countenanced by the Statute Book, an unerring Guide, that they were not only made but dy'd so early as in the Year 1220. one Hundred and Eleven Years before that Time; and probably the Origin of the Manufacture was much earlier than that.

The Quantity of Wool our Country produced soon after, is to be guessed from the vast Exportation we have named under those Flemish Merchants; and this as recorded punctually by Rymer *.

* *Rymer*, vol. 2. p. 50.

In 1284. foreign Merchants were permitted to establish themselves in the Kingdom, for the Encouragement of the woollen Manufactures. They had till this Time been obliged to lodge in the Houses of our own People, and could not trade otherwise than by making their Landlords their Brokers; but now they were permitted to traffick in their own Names; and the Privilege granted to them was of the utmost Benefit to the Trade.

In 1291. Sandwich in Kent was made the general Market, by an Act of Edward the First, and so vastly did the Trade encrease, and the Manufacture flourish, that but five Years after this the Custom upon it was raised from twenty to forty Shillings a Bag; and the Traffick was able to support it.

This Demand was indeed repealed, but not because it would have ruined the Trade, but because it was made by the King's sole Power. That was a Stroke too arbitrary for those Days of virtuous Liberty: the Merchants exclaimed against it, and they obtained a Release from the absolute Exaction, the additional Duty being charged by this Act upon them with such Limitations, that it was in a Manner dependent on their Pleasure; and soon afterwards it was left to the Determination of Parliament.

A few Years after this we find the Traffick for Wool and woollen Manufactures very flourishing in London; and several of the Sea Port Towns: the King's Duty upon exported Wool was established upon it according to the Weight; and the Scales for weighing it in all Parts were made by those in London, and delivered in a solemn Manner by the Lord Mayor into the Exchequer, to be sent to their respective Places.

In 1297. the Wars with France demanding a great Supply: the woollen Trade was so flourishing that Recourse was had to it. The Parliament granted for two or three Years forty Shillings a Sack upon Wool. This was the Exaction that had occasioned so much Disturbance at first; but now it was legally established and regularly paid. The King promised never to demand more than the old Duty, without Consent of Parliament; and the woollen Trade flourished under this large Drawback, and the Disadvantages of a War together.

These were Times of virtuous Government. The King was thankful to his Subjects for so large a Supply, and he was happy to find that the woollen Trade could bear it: but he demanded it no longer than it was required by the Exigences of the State, on Account of which it was raised. He called a Parliament, and of his own free Accord gave up the additional Duty, publishing a Proclamation that no more than the old Sum should any where be demanded.

The Price of Sheep now naturally rose with the Value of their Wool, but still the Number made some Alteration. We read in Thorn † of three Shillings apiece being given for three Hundred Sheep; but it was at an Installation Feast, 1309. The current Price about that Time was much less, as we find in the Acts of the Common Council of London, and in Dugdale.

† *Decem Scriptores.*

In the Year 1315. we find the Price of Sheep established in such a Manner, as to give us a fair Insight into the Value of Wool at that Period. The Sheep, if delivered shorn, was fixed at Fourteen-pence; if unshorn at Twenty-pence ‡, but we must not extend this Consideration farther than to the Value of the Wool, for it was a Time of Famine.

‡ *Stilling fleet's Chron.* p. 72.

From this Period the woollen Trade became an Object more than ever of the publick Concern. Persons of all Nations who could improve the Manufacture of Broad Cloth, were encouraged to come over: and among Numbers brought under great Encouragements from Flanders, Brabant, and Zealand; there were some so worthy of the Advantages they received, that they soon set the Trade upon a most respectable Footing Abroad, and upon the most profitable Foundation at Home.

In Consequence of the greater and more profitable Traffick in this Article, the Price rose; and the more Assistances were drawn from it for the State: in Edward the Third's Reign, toward the End, we read of Subsidy after Subsidy on Wool: and in Richard the Second's Reign more Subsidies were demanded: the Traders complained, and the Matter being candidly examined,

it appeared that though they were not wholly without Reaſon of Complaint, yet the Trade could bear additional Loads, and that they might raiſe Fortunes.

In the Reign of HENRY the Fourth the Sanction of Parliament granted to the King, for a limited Time, a Subſidy of fifty Shillings upon every Sack of Wool belonging to the Natives, and four Pounds on thoſe of Strangers exported; and ſuch was the Produce of Wool in BRITAIN at that Period, and ſuch the foreign Demand for it, that the Quantity exported was not leſs than a Hundred and thirty Thouſand Packs in a Year: and in RICHARD the Second's Time the Subſidy had amounted to a Hundred and ſixty Thouſand Pounds. This is related by PRYN, and the other Hiſtorians, and is ſupported on the beſt Authorities.

The ſame Subſidy that had been granted to HENRY the Fourth, was allowed for four Years in HENRY the Fifth's Time.

In the Reign of HENRY the Sixth we find thirty-three Shillings and Four-pence a Sack allowed to the King on the Natives Property in this Article; and forty-three Shillings and Four-pence on that of Strangers. The woollen Trade encreaſed under all this Demand; and NORWICH about this Time became eminent in it.

In the former Reigns the large Subſidies on Wool had been granted only for two, three, or four Years, in Time of Neceſſity; but in the Reign of EDWARD the Fourth, the Charge of thirty-three Shillings and Four-pence on the Wool of the Natives, and of three Pound Six and Eight-pence on that of Strangers, even the naturalized, was granted to him for Life.

Even this proved no Check to the Traffick. Encloſures became more frequent; the Land was more improved, the Management of the Cattle and their Wool was better underſtood; and ENGLAND carried the Praiſe for this Article before all other Nations.

In the Reign of RICHARD the Third, though the Traffick was encumbered with large Subſidies, it encreaſed continually. In the ſucceeding Reign of HENRY the Seventh, the greateſt Regard was ſhewn to Trade in every Article, and in none more than this. The Exportation of Wool was limitted, and the Manufacture of Cloths encreaſed accordingly.

In HENRY the Eighth's Reign the Produce of Wool was greater than at any Time before; and its Price encreaſed with the Quantity; ſuch was the Demand for it Abroad, and ſuch the Conſumption of it at Home. Farmers were laid under certain Limitations, as to the Number of Sheep they were allowed to keep; but theſe were very extenſive ones, and we may ſee by the Account preſerved of this Tranſaction, and of the Price of Things at that Time, to what an Advance the Care of that Animal, and the Price of its Fleſh and Wool, had riſen.

No one was to have more than two Thouſand, but this with many Exceptions. The Statute, by way of Reaſon, recites "The advanced Price of "all the Native Commodities in the Kingdom. "That ſome Perſons had at that Time vaſt Num"bers of Sheep, which for Victual had riſen in "Price from two Shillings and Four-pence, or at "the moſt three Shillings, to ſix Shillings, or five "Shillings, or four Shillings at the leaſt; and "that a Stone of Cloathing, heretofore in ſome "Shires accuſtomed to be ſold for Eighteen"pence or Twenty-pence, had riſen to four Shil"lings, or three Shillings and Four-pence at "leaſt. In others, where it had been ſold for "two Shillings and Four-pence, or two Shillings "and Eight-pence, or three Shillings at the moſt, "it was then ſold for five Shillings or four Shil"lings and Eight-pence the leaſt."

If we look back to the Prices of Wool in the thirteenth and fourteenth of EDWARD the Third, which was near two Hundred Years before, the loweſt, viz. the Wools of CUMBERLAND and WESTMORELAND, were ſold for above two Shillings per Stone, excluſive of the Duty, which was ſomething more than one Shilling and Six-pence per Stone; and thoſe of SALOP, at better than four Shillings and Ten-pence per Stone, in like Manner. So that in Fact, there ſeems to have been at this Time, no Advance in the Price of Wool from the Period juſt mentioned: but very much the contrary, conſidering that the Shilling was then two Hundred and Sixty-four Grains; and at this Time, but one Hundred and eighteen. Nor was it any Advance from the cheap Price of which H. KNYGTON ſpeaks, becauſe the Shilling was then two Hundred and thirteen Grains. Much leſs was Wool dearer at this Time, than in the fourth of HENRY VI. The Price being then not only nearly equal to the higheſt Rate mentioned in this Act, but the Shilling then, at the loweſt, contained Twenty-four Grains more than at the Time of the Act; and therefore we are to ſuppoſe the Complaint then made concerning the Dearneſs of Wool, to have had reſpect to ſome intermediate later Times, in which the Price of Wool does not now appear; and which was probably occaſioned by the Monopolizations of the Merchants of the Staple, and the Manufacturers.

As to the Price of Victual, it will not be amiſs to inſert here a little Piece of Hiſtory, which Biſhop FLEETWOOD takes from Mr. STOW, in the Year one Thouſand five Hundred and Thirty-three. It was that Year enacted, "That Butchers ſhould ſell their Beef and "Mutton by Weight: Beef for a Half-penny "the Pound; and Mutton for three Farthings: "which being deviſed for the great Commo"dity of the Realm, as it was thought, proved "far otherwiſe. For at that Time, i. e. one "Thouſand five Hundred and Thirty-three, "fat Oxen were ſold for Twenty-ſix Shillings "and Eight-pence, fat Weathers for three Shil"lings and Four-pence, fat Calves for the like "Price; and a fat Lamb for Twelve-pence. "The Butchers ſold Penny Pieces of Beef, "for the Relief of the Poor; every Piece two "Pounds and a half, ſometimes three Pounds. "And thirteen, ſometimes fourteen of theſe "Pieces for Twelve-pence. Mutton Eight"pence the Quarter, and a Hundred Weight "of Beef for four Shillings and Eight-pence. "What Price it has grown to ſince needs not "be ſet down. At this Time alſo, and not be"fore, were foreign Butchers permitted to ſell "their Fleſh in LEADEN-HALL Market of "LONDON." I ſuppoſe by Foreign Butchers,

he means ſuch as lived not, or had not ſerved their Apprenticeſhip in London.

CHAP. XL.

Of the Wool Trade from the Time of Henry *the Eighth.*

WE have ſeen what a prodigious Advance the Wool of England made in the ſeveral preceding Reigns, and we ſhall find it in this continue encreaſing.

Huſbandry had been in early Times but very little underſtood in England, but the Regard to this Commodity, the Demand for which was ſo conſiderable, and the Price ſo large, gave a Spirit to the People concerned in it at that Time, which we wiſh had been continued to the preſent.

In Edward the Sixth's Reign we ſeem to have had Farmers in England, who underſtood the Management of Paſture Ground ſo well, that it were happy if Books had been written on the Subject, which had perpetuated their Improvements. The great Benefit of Encloſures was a little before underſtood fully, and they encreaſed in the Reign of Edward the Sixth. The Care of the Paſturage grew with the Number of Encloſures, and the thriving of Sheep, and the Price of Wool, with it. That Commodity ſold in this Reign dearer than in any of the preceding. Statutes were made from time to time, to encourage the Manufacture of Cloths, and Marts were eſtabliſhed by Authority in different Places.

In the Reign of Philip and Mary the Subſidies granted to Edward the Sixth were continued, only with a Limitation in Favour of naturaliſed Strangers, or ſuch as ſhould be naturaliſed. Many good Statutes were enacted in Favour of the woollen Manufacture in this Reign; and it throve greatly under the prudent Regulations that were eſtabliſhed, and extended itſelf to many Parts of the Kingdom.

In Queen Elizabeth's Time a Subſidy was granted for Life on this Article, included in Tunage and Poundage; many good Statutes were made in that Reign, and Numbers of the French and Flemish engaged in the Cloth Trade, leaving their native Country becauſe of Perſecution, brought over their Secrets, and encreaſed our Credit. In this Reign Wool unmanufactured roſe from its former Price, which might be called Thirteen and Four-pence to two and twenty Shillings a Tod.

We may ſafely eſtabliſh the Period from the End of Edward the Sixth's Reign, to the End of Queen Elizabeth's, as the moſt flouriſhing of all Times for the Wool Trade of England. It has never riſen much higher ſince, and it has very often been much lower; in general, conſiderably below that Standard.

Yet even in that Time we were far from ſupplying all the World, or all Europe, with Cloth; for there were many other Countries very eminent in the ſame Manufacture: this therefore, as we have ſhewn before, is an imaginary Notion, and it is altogether erroneous to ſuppoſe we ever did, or ever ſhall have that vaſt Trade to ourſelves. It is enough if we can get the Superiority in the Manufactures, which doubtleſs we may; and we may be very proud of our Succeſs, if we can yearly bring in ſuch Sums as it then raiſed; which were, moderately ſpeaking, near three Millions a Year.

In the Time of James the Firſt Wool afforded Subſidies, and that largely. New Regulations were made, and Statutes enacted. Monopolies and Oppreſſions were introduced, but the Clamours of the People got the better of them: the Deſire of growing rich too faſt became however general among the woollen Dealers, and hurt the Trade extreamly: Abuſes were committed in the making Cloth; and our Credit in Conſequence declined, during this Reign, in foreign Markets. Proclamations were publiſhed to prevent the Exportation of Wool, and Search was made into the Nature of the Abuſes; but in vain. The Manufacture dwindled, and the Price of Wool fell from Thirty-three to eighteen Shillings a Tod.

The firſt Years of King Charles the Firſt's Reign, promiſed the Revival of the woollen Trade; but the Diſputes ſucceeding reduced it lower than ever. Proclamations now took the Place of Statutes; and the Exportation of Wool was forbid by ſeveral of them.

In 1640. Wool was advanced again to Twenty-four Shillings the Tod.

In 1671. many Attempts were made to reſtore theſe Manufactures to their former Glory. The bad Conſequences of ſuffering our Wool to be exported unmanufactured were ſhewn; and Propoſitions made for gaining ſeveral hundred Thouſand Pounds a Year, by throwing that Trade into a better Method: but theſe were Times in which Men better knew what ſhould be done, than how to do it.

In 1685. the French began to ſupply foreign Markets with what they called English Cloths. Theſe had been made of English Wool, and while that was, in deſpite of all Remonſtrances, ſuffered to be exported; and ſo many Diſadvantages laid on our Manufactures at Home, it was no Wonder they could under-ſell us in the ſame Articles. The publick Attention was waked by this, the Exportation of Wool was abſolutely prohibited, and great Encouragements were given for the Produce of Wool, and for the working it here into marketable Manufactures. This raiſed the Spirit of the People, and the Advantage was ſoon ſeen; happy had it been if the Meaſures ſo projected had been as properly continued.

When Wool, except in woollen Manufactures, was prohibited Exportation from England, the French, and other neighbouring Countries, got it from Ireland; and this was ſoon ſeen, and its Diſadvantages; and Laws were enacted againſt it.

In 1703. the woollen Manufactures began to flouriſh again in England: a Treaty was ſoon after made with Portugal very advantageous to them; and there was the Appearance of their again making great Progreſs. The French droop'd in this Article, for ſome Time after they were deprived of our Wool; but they found the Way afterwards to rival us, with what they produced

duced at Home, or got from elſewhere; and the Manufacturers with us ſaw that there was no Way but Integrity in their Dealings, and a Care of the Trade that could give them the Preference.

Theſe great Articles of the Trader's Character, were not found: integrity was wanting in ſome, and Knowledge or Attention in others, and for ſeveral ſucceeding Years Things, in this Reſpect, went worſe and worſe: the Neglect of thoſe moſt concerned let FRANCE get our Wool again in great Quantity, and our own Manufacturers drooped in proportion: for this has been found at all Times, that although the FRENCH can carry on their Traffick in this Article without us, yet they always ſucceed beſt when they have moſt from us; and we droop in proportion.

To cloſe this important Conſideration we muſt obſerve, that on two Things depend the flouriſhing State of the BRITISH woollen Manufacture: on the Care of the Huſbandman in the proper Management of his Sheep and their Produce; and on the preventing its Exportation when we have it in the proper Condition. We have laid this ſhort Hiſtory of the Riſe and Progreſs of the woollen Manufacture before the Huſbandman, to ſpirit him up in this great national Concern; and to ſhew him that they are idle Declaimers who tell him ENGLAND always muſt be the Country for the beſt or largeſt Quantities of Wool; that he may know how much it is neceſſary to exert himſelf in a Concern on which the Welfare of his Country, and his own Advantage ſo greatly depend.

Having given him this full Detail of the State of the Trade, we ſhall proceed to the Practical Part; and acquaint him how he is to manage his Wool to the beſt Advantage. We ſhall not enter upon a nice Detail of the Manufacturer's Profeſſion, but only lay down the plaineſt and moſt profitable Rules for ſo much of the Management of Wool, as concerns the Farmer: that is, the preparing the great Part for Sale; and the working up the reſt at Home, for the Service of his Family.

CHAP. XLI.

Of cleaning, carding, and greaſing of Wool.

WE have, in its proper Place, laid down all the Rules needful to the Huſbandman for the Choice, breeding, and feeding of his Sheep, and have at large acquainted him with all that is needful to be done in the great and important Article of Shearing.

We will ſuppoſe therefore that he has got his Wool from the Backs of his Flock, and proceed to tell him what he is to do with it. The Miſtreſs of the Houſe naturally undertakes the Office of preparing the Wool for her Family Clothing: the Huſbandman is therefore to deliver to her ſuch a Quantity as will anſwer this Purpoſe, rough from the Hands of the Shearers.

The firſt Thing to be done with this is to open it with a Pair of Shears, and cut away all the foul Pieces, Knots, and Lumps of whatever Kind. Theſe muſt be laid by for meaner Purpoſes, and the reſt thus cleaned muſt be broke and divided very carefully between the Hands, that there may be none of it left matted together.

When it is all thus clean, looſe, and fine, it is ready for carding: but as ſome will be required white, and other Part coloured, it is to be ſeparated for that Purpoſe. Such as is for Colours muſt be divided into different Parcels, according to the intended Dyes; and the uſual Way is to keep each Parcel in a ſeparate Bag of netting, with the Weight marked upon it. Theſe are then to be ſent to the Dyers, and the Owner will be ſure, by this Precaution of the weighing and marking, not to be deceived.

The white Wool as it is, and the other when dyed, are to be wrought juſt in the ſame Manner.

The firſt Operation is carding: and the Intent of this is to mix and blend equally every Part; to tear it open perfectly; and to diſcover and ſeparate any Knots or Lumps, which may have been ſo ſmall that they were not obſerved in the breaking of the Wool by Hand.

This carding ſhould be very carefully performed by Means of a Pair of Stock Cards well faſtened to a Form. The whole Quantity is to be over and over combed and carded on theſe, and the leaſt Knot that is found is to be ſeparated.

When the Wool has gone through this careful Management, it is to be greaſed. This is done by Means of Oil; and the common Kind of Oil uſed for the Purpoſe is the Rape Oil made from Coleſeed, which we have before named in its Place.

The Wool is to be ſpread evenly upon a large flat Bed, and the Rape Oil is to be ſprinkled on it carefully with the Hand, till there is enough put on to wet the whole in every Part. Then the Wool is to be moulded and worked about with the Hand, that every Thread of it may be moiſtened. The beſt Way is to turn the whole once, or oftener, as the Oil is ſprinkled upon it; and by that Means it works in the eaſier. Every Part muſt have its Share, that is the great Concern. Yet in the Care of this there muſt be Regard had to the Quantity of Oil employed: it would be eaſy to wet the Wool, by pouring on a great deal of Oil at once, but this would ſpoil it: the Art conſiſts in having every Part really wetted, and yet none too much. This is the Reaſon of ſprinkling the Oil on ſoftly, and turning the Wool often while it is doing; and in this conſiſts the Art of greaſing, as it ſhould be: it is of the greateſt Conſequence, to moiſten the Wool well with a little Oil, for on this depends the Perfection of the Web. If too much be uſed the Thread will not draw, but will fall into very ſmall Pieces.

There is no better Way of being ſure of finiſhing this right, than the trying it at Times as it is doing. When the Wool is greaſed it is fit for ſpinning: therefore nothing will be ſo proper as to have a Wheel by, and try it from time to time. A little Oil ſhould be worked in at firſt, and then the Wool tried on this Wheel: if it draws dry and breaks, then a little more Oil is to be uſed; for the Uſe of this is to keep it moiſt and ſupple, and to make it hang together: this Purpoſe it excellently anſwers when a ſmall

Quantity of it is well mixed with the Maſs; but as we have obſerved already, when too much is uſed, and it is put to the Wool in a careleſs or unartful Manner, it takes quite a contrary Effect, and the Wool falls to Pieces.

When the Wool, on trying it, draws well and holds together, the Quantity of the Oil is right. The Eye and the Hand will judge of this, when People are very much uſed to it, but there is no Way ſo ſure as this of Trial. In general Wool requires ſomewhat leſs than a third Part of its own Weight of Oil for this Operation. Therefore that thoſe who are not uſed to the Manufacture may proceed upon ſome Certainty, let them firſt weigh the Wool, and to every three Pounds of it allow a Pint of Rape Oil, bare Meaſure; or to every ten Pounds of Wool three Pints of Oil: let about two Thirds of this be uſed at firſt, and then the Wool tried on the Wheel, for ſometimes this will do; and if not, let ſome more of the Quantity be uſed, but carefully and with great Diſcretion.

Oil is the common Thing uſed for this Purpoſe, but any greaſy or fatty Subſtance will do: and indeed any Kind of Oil. Where Rape Oil was not to be had I have ſeen other common coarſe Oil uſed; and many a good Houſewife has made Hogs Lard anſwer the ſame Purpoſe; but the Oil mixes more eaſily, and more thoroughly with every Part of the Wool. When Hogs Lard, or any other ſolid fatty Subſtance, is employed inſtead of Oil it muſt be melted, and very carefully ſprinkled on while it is fluid, and mix'd well in by turning and ſoftly working with the Hands.

CHAP. XLII.

Of tumming and ſpinning of Wool.

THE Wool may, for ſome Purpoſes, be ſpun as it comes from the Hand of the Houſewife in the greaſing; but the better Way is to uſe this only as a Preparation for the tumming. This tumming is another carding, and it brings it to a great Degree of Fineneſs and Suppleneſs; and makes it fit for all the Houſewife's Purpoſes. The Method of tumming it properly and effectually is this.

When it is thoroughly oil'd or greas'd, and will hang in a Thread from the Wheel, let it be very well worked in the Hands, and then ſpread out as at firſt. Let a Pair of long-rooth'd Cards be made ready; and let it be very well carded and combed again, drawing it perfectly fine; and ſeparating every thing that is knotty, tangled, or uneven. Theſe Pieces, thus ſeparated, are called Tummings, from the Name of the Operation; and they are to be reſerved by themſelves for other Purpoſes. They are not to be mixed with the firſt foul Parcel, becauſe having gone through ſo much more of the Operation, they will be great deal finer than they.

The tumm'd Wool is now perfectly ready for ſpinning. The Wheels muſt be large, and a ſteady and careful Hand muſt be employed in the ſpinning it.

There is ſo much Difference between the Wool of one ſhearing and another, that all will not ſpin to the ſame Fineneſs. No Force is to be uſed in this, for it will not ſucceed. If any one ſhould attempt to force a coarſe Wool to run into a fine Thread, it would never anſwer in the other Parts of the Manufacture. Things muſt be taken as they are: and when the Wool is ſuffered to run from the Wheel well, as it naturally offers, it will be ſure to hold good in every ſucceeding Proceſs.

A judicious Perſon will ſee, from the Nature of the Wool, what Service it will anſwer from the Beginning, but this is not eſſential; for whether it be formed for a larger or a finer Thread, the ſame Care is to be taken of it in every Article we have already named. The Difference ariſes partly from the Breeds of Sheep, and partly from the Care taken of them in their Management; both theſe Articles we have treated of already, and therefore need not repeat what we have delivered on thoſe Heads.

When the Wool is of a coarſer Staple it ſhould not be wrought into a fine Thread, for if this be done it will want Subſtance when it comes to the Mill; it will beat to Pieces, or never bed well, and conſequently the Cloth will have little Strength, and do little Service.

In the ſame Manner if any one ſhould force a Wool of a finer Kind to ſpin out into a thick Thread, being againſt its Nature, it would be greatly to its Diſadvantage. In this Caſe a great Part of the over Thickneſs of the Thread muſt be taken away afterwards to waſte, or the Cloth will wear coarſe.

This is all the Caution required in the common Way of ſpinning, and the doing it properly and well depends, as we ſee, principally upon the keeping a regular Hand, and letting the Wool work according to its Nature; but a great deal more may be done by thoſe who are expert. There may be two Kinds of Thread ſpun; and indeed it always ſhould be ſo. Two Manners of ſpinning ſhould make theſe two Kinds of Thread, which are called the Warp and the Wooſe.

The Difference is this. The Warp is to be ſpun cloſe, round, and hard twiſted, and it ſhould be ſtrong and very well ſmoothed: the Wooſe may be ſpun more looſe, open, and but half twiſted. The Reaſon of this will appear very plainly, when the Farmer conſiders their Uſe and Condition. The Thread of the Warp is to run through the whole, and to endure the fretting and beating of the Beam: the Wooſe, on the contrary, requires no great Strength or Smoothneſs, becauſe it only croſſes the Warp without any Violence or Straining.

It is not only that the Wooſe does not require the Firmneſs and Hardneſs of the warp Thread; but its being looſer and ſofter makes it anſwer the Purpoſe better: it beds the cloſer and evener in the working, and the Warp has all the neceſſary Strength for keeping the whole together.

The Intent of the Wooſe is to cover in and unite all together, and this is to be perfected by beating in the Mill. This is an Operation altogether needful to the Cloth, yet the leſs of it can be made to anſwer the Purpoſe the better. Now the proper ſpinning of the Wooſe Thread is an im-

important Article in this Reſpect. Many a good Houſewife thinks ſhe never does well unleſs ſhe make one Thread as hard as the other, and therefore ſhe orders all the Parcel to be ſpun alike, thinking the leaving the Wooſe thus open to be only a Piece of Idleneſs. But the looſer this Wooſe Thread is the eaſier it is to make it cover, and the leſs beating it takes; the harder the more. This is an important Article, and has been much diſputed, but the Practice in the Cloth Countries, which is founded on long Experience, ought to determine it. 'Tis a common Opinion that the making both Threads hard, though it requires a great deal of beating to bring the Cloth to Form, yet gives it Strength: but this is proved an Error.

The Warp is the Thread on which the Strength of the Fabrick is to depend, and as to the other, its being hard is found to be of no Service. It makes the Cloth fret and wear, whereas the leaving an open looſe Thread for the Wooſe, gives it a pliable Softneſs that prevents all fretting and cracking.

We hear every body of late ſpeak of the French Cloths; they praiſe them for their Pliantneſs and eaſy Wear; and though they are in reality greatly inferior to the English in Subſtance, and many other Particulars, yet People prefer them for this Reaſon. A Deſire of being ſerviceable to my Country in this great Article, has led me to make Enquiries among thoſe who underſtand the French Clothiery, and I find it is altogether owing to their ſpinning two Threads out of every Parcel of Wool, and keeping one for the Warp and the other for the Wooſe, the latter of which they make ſo looſe that 'tis hard to work it. The Conſequence is, that a very little beating brings the Cloth into a Body, and when finiſhed it is ſoft, pliant, and very fit for wear. One would think theſe French Cloths, by their Look, and by feeling of them, could do little Service, but the contrary is found upon Trial. They never crack, and the Looſeneſs of the Wooſe Thread riſing from time to time, keeps them from wearing thread bare. Our hard Cloths are very liable to grow bare at the Seams; theſe never do; becauſe they are leſs harſh. They are fitter for Gentlemen's Service than for labouring People; but it would be eaſy to follow their Practice more moderately, which is what we recommend to the Huſbandman, in preparing Cloth for his own Family, and then there would be more Service and more Credit every Way in theſe Cloths, than in thoſe which are made every Way with a harſh and hard Thread.

CHAP. XLIII.

Of the winding the Thread, and finiſhing the Work.

WHEN the Wool, after the dreſſing, oiling, and tumming, is ſpun into Thread, or Yarn, it is for Convenience to be wound. Thoſe who continue the old Houſewife's Practice of ſpinning it all alike, have nothing to do but to wind it off as it is finiſhed from the Broch, into a Clew or round Bundle. But the better Way is, as we have ſaid, to ſpin it in two Kinds, and wind each off in its ſeparate Clew, the warp Thread and the wooſe Thread. In this Condition it is ready to be made into Cloth. The making it up is the Buſineſs of the Weaver, a Trade to be learned by an Apprenticeſhip, not by any Deſcription that can be given in Writing; nor is it our Purpoſe here, for we limit ourſelves to the Buſineſs of the Huſbandman alone, for whoſe honeſt Service this Work is written. However, though we are not to inſtruct the Weaver in his Profeſſion, yet it will be proper to inform the Farmer ſo far in the Nature of it as concerns himſelf; that is, to give him juſt ſo much Inſight into the Work, that he may know whether he has Juſtice done him or not.

In the firſt Place, before the Yarn is delivered to the Weaver, it is fit the Owner ſhould know how much Cloth it may make; I have known an ignorant Perſon cheated, in this Reſpect, of half, nay two Thirds, by the Villainy of the Weaver.

The Quantity of Cloth will be very tolerably determined by the Weight of the Yarn. We have adviſed the weighing of the Wool before, but it will be proper finally to weigh it again, when it is in the Clews: this is very eaſy, and as there may have been ſome Waſte in the former working, it is the beſt Method.

The general Computation, in the Language of the Workman, is, that it will run Yard and Pound; and this is in the common Run true, provided the Wool have been originally good, and the ſpinning carefully performed. If the Yarn be coarſe it will make leſs.

This being determined, the next Care is to obſerve how many Pounds of Yarn are laid in the Warp, and ſo many exactly muſt be reſerved for the Weft or Wooſe. This is a Rule not univerſally practiſed, but there is none better. Even and even is the Practice of the beſt Workmen, when they have a Mind to make the beſt Cloth. There may be Differences, but they will be for the worſe, at leaſt they certainly will in the Cloths we are treating of, which are the common Kind for the Service of the Family.

If the Owner will carry his Obſervations farther, it will be ſo much more to his Advantage: though he cannot do the Weaver's Buſineſs, he can know when it is well done; and he ſhould over-look it often, to ſee that it be ſo. He is to obſerve that the whole be woven cloſe and true; and in every Part alike.

From the Weaver the Cloth is to be carried to the Fulling Mill, and there he may ſee alſo that the Buſineſs be done well and carefully. We have ſhewn him that ſome Yarn will make the Cloth require more milling than other: but if this have been ſpun well in the two Kinds, let him ſee that it have not more than it requires.

The ſcouring Earth is the next Article to be conſidered, and none is of more Importance. It is a moſt neceſſary Ingredient, but it may be a very hurtful one. Its Uſe is to clean, but it may tear the Cloth: its Fineneſs is all in all on this Head, for if it be coarſe, and the Work ill ma-

naged, it may very naturally and eaſily beat Holes in the Cloth.

From the Fuller the Cloth is to be carried to the Sheerman, and there, if the Eye of the Owner follow it, he will be ſure to have it the better done; he is to ſee that this Workman hurle it, and dreſs it ſufficiently; and ſheer it according to his Purpoſe: Moderation is the beſt Rule. If it be left too rough it will not wear clean, and if too cloſe it will be ſoon thread-bare.

CHAP. XLIV.

Of the dying of Wool.

THE Huſbandman will conſider in this Place, as in the preceding Chapter, that we are writing ſolely for his Service, and the Reader who has Candour will not purſue the Subject farther in this Place; nor cenſure us for having conſidered it thus far. We do not intend to teach the Art of Dying, any more than we attempted before to inſtruct our Huſbandman in the Trade of Weaving. We only aim to give him all the Information that may be needful; and to lead his Curioſity no farther. We have, in the laſt Chapter, told him how he is to judge of the making up of his Cloth; but in this we ſhall proceed a little farther. We ſhall not enter into the Buſineſs of the Dyer at large, but ſhall ſhew the Countryman how he may, in thoſe Inſtances that ſerve his common Purpoſe, tinge his Wool at a ſmall Expence, and do in a Manner all within himſelf.

The Colours the Countryman will deſire to give his Wool, may be reduced to a ſmall Number. Black, red, blue, green, and yellow, may be named as the five Principal, and if we add to theſe a pale Purpliſh, an aſh Colour, and Hair Colour, from one or other of theſe, and the Mixtures compoſed, as we ſhall ſhew from theſe variouſly combined, he will draw all the Variety that he deſires.

For blue, grind in a Mortar a Pound of Indigo-blue, and mix it with two Gallons of ſtale Urine, ſet it on the Fire, ſtir it well together, and put in the Wool when it is made moderately hot. Let it continue ſome time, and it will have a good ſtrong blue Colour.

The Quantity of the Ingredients muſt be proportioned to that of the Wool; and the beſt Time for dying it is before the oiling.

To die black beat to a groſs Powder two Pounds of Galls, put them into a Pot with two Gallons of River Water, put to them one Pound of common green Copperas, boil them up well together, and the Liquor will be like Ink. Put the Wool into this and boil it. Then let it cool, take it out, and hang it to dry.

To dye red ſet on a Quantity of River Water, in a large Earthen Veſſel. When the Water is ſcalding hot put in a Peck of Wheat Bran: let this boil a few Minutes, then pour it into a Tub, and put to it twice the Quantity of cold Water. Set this by for a Week. Then weigh the Wool you intend to dye red, put it into the Water and Bran; and with it, to every ten Pound of the Wool, one Pound of Allum. Let theſe boil together an Hour: then take out the Wool. Beat to Powder a Pound of Madder Root, put it into Bran and Water, and when it is hot, and the Madder is well mixed with it, put in the Wool, break and divide it well with the Hands; and when the Liquor is ſo hot the Hands cannot bear it, ſtir it about with a Stick; when it is well coloured take it out; and hang it up to dry.

To die yellow boil the Wool in Allum Water, made as ſtrong as before directed; then take it out, and hang it to dry. Set on a large Pot with River Water, and a good Quantity of Dyer's Weed, of which, as alſo of Madder, we have ſpoken in their Place. Put the Wool into this, divide and break it well, that it may receive the Colour throughout, and it will thus become of a very good ſtrong yellow.

To die green, the Huſbandman's beſt Method is firſt to die his Wool blue, as we have directed already: when it is dry in this Colour let him ſet on a Pot of Water with Dyer's Weed, and put in his blue Wool. It will receive the Die in the ſame Manner as the other, and by a natural Conſequence the Wool become green; becauſe a Mixture of blue and yellow is always green.

To die a pale Purple the ſame Ingredients are to be uſed as for dying black, only in leſs Quantity, and in a different Management. The black is only a purple carried to that Extremity. This is plain from Experiments eaſily tried. The ſame Ingredients that make this black Die make Ink, and they will always make purple inſtead of black in a ſmaller Quantity. If Copperas be diſſolved in Water, the Liquor will be clear. Then let Galls be boiled in Water, and ſome of that being dropped into the other it will raiſe a purple Cloud, and when more is added it will be darker, till it become quite black. In the ſame Manner this Die, which is for black in the common Way, may be made to anſwer for a pale Purple. It is to be done thus.

Bruiſe ſome Galls to a coarſe Powder, ſet them over the Fire in a Veſſel of River Water, and when the whole is hot put in the Wool. Let it boil half an Hour, then take it out and hang it to dry. The Colour of the Wool will be ſcarce at all altered by this. Let the Liquor be poured off clean from the Galls, and put to it a ſmaller Quantity of Copperas than is ordered for black dying. The Liquor will inſtantly become black. Draw the Wool lightly through it; and it will get a pale purple Tinge. If it be not deep enough put it in again. The Care muſt be not to make it too deep.

To die Hair Colour ſet on a Pot with ſtrong Allum Water: boil the Wool in this, and then take it out.

Then mix together a good Quantity of Soot and Urine, and when they are hot put in the Wool. Let it remain a moderate Time, then take it out and hang it up to dry. This makes a very good, ſerviceable, and laſting Colour.

To die Aſh Colour make a Liquor in the ſame Manner as for the pale Purple, but inſtead of putting in the Wool boiled only in Galls, uſe Wood died red, as before directed, with

with Madder. This will make a very pleaſing Aſh Colour, with a light Glow of the red, which will be very agreeable.

We have thus laid before our Huſbandman the Method of dying all the uſeful plain Colours, in an eaſy and cheap Manner; and ſhall, in the ſame Way, ſhew him how to make a Variety of Mixtures in his Cloth from theſe ſimple Dyes in the Wool. The Dyers uſe more laborious Methods, and more expenſive Ingredients; but this is ſufficient for all the Purpoſes of the Country Farmer.

We have directed the Wool to be dyed before the ſpinning, which is by much the beſt Way; and in treating of the mixed Colours for Cloths, in the next Chapter, we ſhall purſue the ſame Method, ordering them to be made from the looſe Wool thus dyed; nevertheleſs, if any chuſe it, they may in the ſame Manner, and with the ſame Liquors, dye the Yarn or Thread after it is ſpun, or even the Cloth after it is wove. Circumſtances may ſometimes render this Management neceſſary, though the other is preferable.

CHAP. XLV.

Of mixing the coloured Wools for weaving.

OUT of the plain Colours we have directed the Farmer to die, it will be in his Power to make ſeveral Mixtures, and thoſe for Service are frequently better than the ſimple Colours themſelves. The Time for doing this is when the Wools are dry, and before they go through any other Operation. Indeed nothing prepares them ſo well for ſpinning; for nothing renders them finer than the neceſſary Diviſion of them in the mingling of their Colours.

If the dy'd Wool be intended to be wrought up in its plain Colour, it is to be treated exactly as the white in all Reſpects, oiling, tumming, and the like; therefore nothing on that Head need be ſaid farther: but if it be intended for Mixture, that is to be made before any thing elſe is done to it.

Mix'd Colours may be compriſed under two Heads, thoſe which are compoſed only of two, and thoſe compoſed of ſeveral.

Of the firſt Kind the beſt are thoſe made up of the darkeſt and the lighteſt or brighteſt Colours, for theſe give a Spirit: whereas two light, or two dark Colours together, make no conſiderable Variations.

The Proportions of the ſeveral Colours in theſe Mixtures, may be varied in a Manner without End; but there is one Proportion which is in general better than any other, and is therefore worthy to be advanced into a Kind of fixed Rule. This is when a proper light and a proper dark Colour are choſen, to weigh two Pounds of the dark, and one of the light, for the Mixture, and in the ſame Manner for any larger Quantity, the bright Colour being only one third Part of the whole. Thus if we ſuppoſe blue and red to be the two plain Colours, of which a Mixture is to be made, and the whole Quantity intended to be uſed to be fifteen Pounds; in this Caſe there ſhould be ten of the blue and five of the red; and ſo in all other Caſes.

The Colours thus produced are what are called mixed Colours in a diſtinct Manner, for when more are uſed they are called Medleys; and the Way is this. Suppoſe three Colours for Inſtance are to be mixed, if two be dark and one light, the Method is to take an equal Quantity of each of the light Colours, and twice the Weight of both the others, of the dark one; on the other Hand, if it be a Medley of two dark Colours and one light, then an equal Quantity of each is to be taken, and they are to be perfectly well mixed together.

When the Wools of theſe ſeveral Colours are weighed out, a large Sheet is to be ſpread upon the Ground, and upon this is to be ſpread an even and thin Layer of the darkeſt Colour, or of one of the dark Colours, when two are equally dark: upon this is to be ſpread another Layer of the lighteſt Colour, and ſo on interchangeably Layer over Layer, till the whole Quantity of Wool that was weighed is ſpread on the Sheet.

Then this Wool is all to be rolled up into one thick, hard, and ſtiff Roll. The Way is to begin at one End, and carefully turn up the Edge round itſelf. This makes a Beginning, and the reſt all rolls upon it very eaſily; a ſteady Hand is to be uſed, and the whole will be thus brought into one long thick Maſs.

One End of this Roll is then to be made faſt in a Frame, or a Perſon is to kneel upon it, to keep it from moving or untwiſting, and beginning at the other the whole is to be pulled out into ſmall Pieces. The ſpreading and rolling of the Wool had before very tolerably mixed the ſeveral Colours, but this does it entirely; the whole will now be an uniform Maſs of a medley Hue, as if dyed of three or more Colours together.

When this is done the Wool is all to be carded and combed together, by a Pair of Stock Cards well fixed to a Form.

This compleats the Mixture, it grows into an even and perfectly uniform Maſs; and if there be any Knots or Lumps in it they are to be carefully ſeparated.

This combing is to be done exactly in the ſame Manner as in the Management of white Wool, before deſcribed; and after this the oiling, tumming, ſpinning, winding, and warping, are to be performed in the ſame Manner. The Cloth thus made has a very good Look, and wears clean: none is fitter for the Service of the Family.

The Farmer or his Wife may thus, without farther Information, perfectly well go through ſo much of the Wool-Dreſſers and Dyers Buſineſs as is neceſſary for their own Concerns, and in Places where thoſe Trades are not at Hand it is a very great Convenience to be able to ſupply their Places at Home.

CHAP. XLVI.

Of Hides and Leather.

THE Wool being diſpoſed of either at the Market alone, or partly at Market, and partly wrought up for the Service of the Family, the

the Care of the Hides of Sheep, Oxen, and other Beasts remains, and is the Farmer's next natural Consideration.

Hides are of various Kinds, according to the Creatures from which they are obtained; and they are accordingly put to various Uses: and they may, like all the Farmer's other Products, be sold by him either rough, or with some Degree of Preparation. The entire Dressing of them is the Business of a distinct Trade, or indeed, taking in the whole Course of the Subject, of several Trades; however, it is proper he should know so much of the intended Operations, as to be able to suit his Hides, as far as lies in his Way to them.

The Skin of the Cow and Ox Kind is so much above the others in Use, that it has, in a Manner, appropriated the Word Hide to itself; those of these Creatures being called, in the common Way of speaking, Hides, and those of other Animals Skins.

The Farmer usually sells his Oxen or Cows alive at Market, or to the Butcher, and has no farther Care about them; but it may happen that he have Occasion to kill them sometimes himself. The Hide then is sold separate. If he dispose of it just as taken off from the Carcase, it is called a green Hide or a raw Hide: but this is generally the least advantageous Method of disposing of it, because the Purchaser knows it will spoil upon the Farmer's Hands, if he does not know what to do with it farther, and therefore that he will take what is offered for it.

We shall prevent this Imposition upon our Husbandman, by acquainting him what may be done to preserve it.

In the natural Course of Things a Hide will keep a great deal longer in Winter than in Summer. Those who deal in them largely are forced often to keep them some Time; or to send them to a considerable Distance before they are wrought. And in this Case they have a Way of preserving them with Salt: this is in the Farmer's Power, as well as theirs: the Hide will not be at all damaged by it, and he may preserve it thus to a better Market.

A good Quantity of common Salt is to be mixed with a tenth Part of its Weight of Allum beat to Powder. The Hide is to be spread upon a Floor, and a stout Fellow is to rub and work this in well with his Hands all over it, and particularly where there are any Crevices, or thicker Places than the rest: when it is thus well salted it may be kept some Time. The best Method is to double it up, and lay it on a Shelf in a Cellar.

This will answer the Purpose of keeping it some Days; but if a longer Preservation be required, for the getting a Number together, then two Days after this first salting let it be spread out again and rubbed well with Salt and a little Salt Petre. A Hide will thus be preserved any reasonable Time.

Hides may be preserved dry in the Hair, by carefully hanging them up single in an airy Place, wiping them frequently and turning them till they harden: and in this Way they will be in the same Manner capable of being put to use; but it is not nearly so well as the other.

The Buffaloe Hides from some Parts of America, are sent over in this Manner, and are dressed afterwards.

The Hides of the Cow and Ox Kind fall into the Hands of the Tanner afterwards, for tanning into Leather; but those of other Creatures, both here and in other Parts of the World are dressed by other Trades, for different Purposes. Shagreen is a Skin prepared in a particular Manner; and Parchment and Vellum are also Manufactures of Skins.

The Skin of the Sheep is the proper Material for making into Parchment, though in some Places Goats Skins are used for the same Purpose.

Vellum is made of the Skins of sucking Calves: and Shagreen of the Skin of the Buttocks of an Ass. This last is a Manufacture of the East.

Chamois, or as it is commonly called, Shammy Leather, is made of the Skin of a particular Kind of Goat; but it is commonly in England no other than Sheep Skin dress'd in a particular Manner.

The Skins of Sheep and Calves dressed in other Ways, make also Leather of various Degrees of Value for the covering of Books, and other such Purposes: the Calf Skin being always much more valuable than the Sheeps.

The Farmer sees here what are the Uses of his various Hides, and will know by this general Account, that he need not want Purchasers for all Kinds. The Principal, which are the Hides of the Ox Kind, go to the Tanners for making into Leather; and he is ready to receive them in either of the three Conditions we have named, that is, green, salted, or dried. He throws them into Pits with Lime, and Oak Bark, and by that Means takes off the Hair, and hardens the Skin for the various Purposes. The Tanner, when he has gone through his Business, delivers the Hide to the Currier, who finishes the Preparation and delivers it for Use.

We shall not attempt to inform our Husbandman in these Particulars; they are separate Trades, and never can fall within the Compass of his Practice. All that he can be required to know is how, to whom, and in what Manner to dispose of the Skins and Hides, which we have shewn him, with their general Uses.

End of the Tenth Book

A Compleat Body of Husbandry.

BOOK XI.

Of making Beer and Cyder. In TWO PARTS.

The INTRODUCTION.

IN this, as in the preceding Parts of this Work, we ſhall lead the Huſbandman in the Road of Reaſon and Experience: conſidering what has been written as it deſerves; and much more what has been practiſed as it has come to our Knowledge: we ſhall begin from the Foundation, that he may be acquainted with every Part, and underſtand every thing that is directed to be done from the making of the Malt to the brewing and fining down of the Beer in its different Kinds, and for its ſeveral Purpoſes.

BOOK XI. PART I.

Of MALT LIQUOR.

CHAP. I.

Of making Malt.

MALT is a Preparation of Barley, fitting it for impregnating Water with its Taſte and Qualities, in the moſt pleaſant, wholeſome, and advantageous Manner.

We ſhall not trace the Subject farther back than to the thraſhed and cleaned Barley, in this Place; becauſe we have brought that Grain from the Seed to the perfect Corn, in a due Courſe of Huſbandry in a preceding Part. Only we ſhall add, that as the beſt Barley will always make the beſt Malt, ſo there is an Advantage alſo in its having grown on a proper Soil, and in its having been dried by a right Management. On theſe two Articles depend the Quality of the Malt. In general that Barley which is tendereſt and moſt mellow, is beſt for the Purpoſe; that which is hardeſt is worſt.

The Manufacturers call this laſt ſteely Barley, and they always avoid it as much as they can, knowing it will give them moſt Trouble, and ſucceed the leaſt in the Brewing.

It would not be of much Conſequence to the Generality of thoſe who brew, to acquaint them with the Advantages of taking the Grain from a proper Ground, and drying it in a proper Manner, for the mellowing of its Subſtance; becauſe they cannot know thoſe Things, but muſt receive it as it comes: but we are here writing to the Farmer, who is to make his Malt from Barley of his own growing and drying: he therefore may chuſe ſuch of his Grain in this Kind as will be ſure to anſwer beſt for this Purpoſe.

The beſt Barley for making into Malt is that which has been raiſed on a chalky Soil, and the worſt of all is that which has grown on Clay. The Difference, in this Reſpect, is greater than any would conceive that have not tried it, the Barley that has grown on Clay being naturally hard, and the other naturally tender.

As every Farmer will not have chalkey Soils among his Grounds, we are to tell him in general, that the tougheſt and ſtiffeſt Lands yield the worſt Barley for Malt; and the lighteſt and melloweſt the beſt. Therefore let him remark ſuch as grows on the lighteſt Soil he has, as fitteſt for this Uſe.

When he has fixed upon the proper Field of Barley for this Purpoſe, let him ſee it be managed according to the Deſign. Good Malt requires that the Grain be full ripe, and perfect in the Ear. It is a common Piece of Neglect to mow Barley at random, often before it is ripe: in this Caſe the Corn is lean, and will never yield a rich Malt.

When it has ſtood to a proper Degree of Ripeneſs for mowing; it muſt be carefully dried after cutting: for if it be houſed before it is properly ſeaſoned, it will contract an ill Taſte, and will make poor Malt, beſide that it will give a great deal of Trouble in the making; not coming, as they expreſs it, ſo regularly as other better Grain. The Barley being thus far properly managed, is to be thraſhed and carefully cleaned, and then it is ready for malting.

Making of Malt is no more than ſoftening and mellowing the Flour of the Barley, and then properly drying it. It is mellowed by Means of Water, and it requires a different Time of ſteeping for this Purpoſe, according to the Nature of the Grain.

Such a Quantity as the Farmer intends to uſe for this Purpoſe, is to be put into a Leaden Ciſtern, or other Veſſel, and Water is to be poured in till it be ſix Inches deep above the Grain. This will allow for the ſwelling, and this will do the Buſineſs in two or three Days, according to the Nature of the Grain; the fineſt Barley always taking the Water the moſt kindly. In order to know when it is ſteeped enough, a Grain is to be taken out, and held end-wiſe between the Thumb and fore Finger, preſſing it gently. If it be hard and ſtubborn it is not ſteeped enough. When it is in right Order it will yield and give Way a little; there will be a Softneſs perceived in the floury Part or Body of the Grain; and the Huſk will ſtart or part a little from it: this ſhews it is juſt in right Order.

The hitting this Time exactly is the niceſt Part of the Art of Malt making: for if it be not ſteeped enough it will not anſwer well in the reſt of the Proceſs; but will give great Trouble, and make imperfectly; and on the other Hand, if it be ſteeped too long it will loſe its Flavour and its Strength: the Beer that is made from it will have a Deadneſs from the firſt, and no Quantity of the Hops will make it keep well.

When the Barley is in this right Condition, the Water is to be drained from it, and it is to lie to come on the Floor: this it will do in a little more than twelve Hours, in favourable Weather, but ſometimes it will be twice or three Times as long.

From the Ciſtern it is to be put into a ſquare Hutch, and there it is to lie quiet about thirty Hours. Then it is to be worked Night and Day, in one or two Heaps, as the Weather is hot or cold, and turned about once in ſix Hours, the outer Part inwards, and the Bottom upwards; always keeping a clear Floor, that the Corn lying next it may not be chilled.

This Care is to be continued till the Malt begins to ſpire, or, as the common Expreſſion is, to come: after this it is to be turned once in three or four Hours; and as it comes more the Heap muſt be ſpread wider and thinner, to cool it. The beſt Method is to lay it out in general in Parcels two Foot and a half thick, and about ten Foot broad, to come and chip gradually, for it ſhould neither ſpire too much nor too quick.

When it is come enough it is to be turned once in two Hours or leſs, for four and twenty Hours together; and when it is fixed, and the Root begins to be dead, it muſt be thickened again, and often turned and worked about, that the growing of the Root may not revive.

A diligent and induſtrious Man is to be employed for this Purpoſe, and he ſhould be without Shoes for fear of damaging a great deal of the Malt. He muſt be careful to turn it frequently and thoroughly, and keep a clean Floor: for if he be remiſs in the Management at this Time, the Malt will either mould or ſhoot out in Leaf. This laſt is the moſt common Accident attending ill Management at that Time of the working; and it is what the Malſters call acro-ſpiring. In this Caſe the fine Flour of the Malt is exhauſted in this uſeleſs Shoot, and the reſt is a Kind of Chaff.

When the Malt is ſo turned as that the Danger of both theſe Accidents is over, it may be put into the Kiln; but a better Way is to throw it up into a large Heap firſt; in which, being in no Danger of ſhooting, it may lie twelve Hours, which will mellow it in a ſurpriſing Manner. After this it ſhould be ſpread and turned once in ſix Hours, and this repeated four Times.

The Weather is a great Article to be conſulted in Malt making, and its Changes make ſo great a Variation in the Proceſs, that no fixed Rule can be eſtabliſhed. Twelve Hours is about the Time it uſually requires to mellow in this Heap, but ſometimes an Hour or two leſs, and ſome-

ſometimes an Hour or two more will be better; the Intent is, that it ſhould mellow kindly without heating too much, and this muſt be tried by examining it; for if it heat too faſt it will be greaſy and of little Value. In the ſame Manner all the other Times of turning muſt be varied according to the Temperature of the Air. The Farmer ſees what is the Intent and Deſign of the Work, and he is to turn it an Hour ſooner, or an Hour later on any of the Occaſions we have named, according to the Nature of the Opportunity. If he make his Malt himſelf this is a very material Part of Knowledge, and, as in other Occaſions, if he do not, it is fit he ſhould underſtand every Part of the Proceſs, that he may know whether thoſe to whom he puts it to be made do him Juſtice.

When the Malt is in the Condition we have named, it is to be brought to the Kiln, there to be dried according to its Nature.

CHAP. II.

Of the drying of Malt.

THERE are various Degrees of drying Malt, according to its intended Uſe; and different Contrivances for the doing of it.

In general the paler the Malt is to be, the more gradual and gentle muſt be the drying: this is the general Rule, and in this there is to be a great deal of Variation. The paleſt Malt will require ten Hours or twelve in drying, whereas the browneſt will be very well dried in four, and a middling Kind in ſix or ſeven Hours.

There is a great deal of Variation in the Opinion of Malſters, about the Thickneſs the Malt ſhould lie upon the Hair Cloth for drying. Our Anceſtors were ſo careful they ſpread it very thin, they rarely let it lie at more than three Inches deep: our late Improvers, as they call themſelves, lay it ſix Inches or more; but this is a very great Error.

By all that I can ſee from repeated Trials, about four Inches is a proper Thickneſs; and in this Manner about a Space of fifteen Foot ſquare will dry two Quarters of Malt.

It is not to lie here all the Time quiet. It muſt be turned upon the Hair Cloth as upon the Floor, and this more or leſs frequently, according to the Nature of the Fire, and the Time intended to be allowed for the drying. If the Fire be gentle, and 'tis a pale Malt, that is to have ten or twelve Hours on the Hair Cloth, then once in four Hours is very well for the drying: if it be a Kind that muſt dry quicker, once in two Hours will be a proper Method: obſerving in this Caſe, as on the Floor, to keep a clean Bottom.

When the Malt is ſufficiently dried, whether by a quicker or a ſlower Fire, it muſt be thrown off from the Kiln to the Floor, and ſpread thin and wide in an airy Place, that it may perfectly cool. Then it is finiſhed and fit for Uſe.

There is not, in all the common Arts of Life, any that requires ſo nice a Caution as the making of Malt. The Time muſt be conſidered: three Weeks is a moderate Allowance, often it will take much longer.

As different Lengths of Time are required for the drying the different Kinds of Malt, there have been alſo invented various Ways of doing it. The Iron-plate Frame, and the Tile Frame, both full of ſmall Holes, are much eſteemed by many; others prefer the Braſs-wire and others the Iron-wire Frame; and others the Hair Cloth: the Huſbandman is not to give his Voice in Favour of any one of theſe in general Terms; but to conſider the Uſe it is intended to anſwer: the Nature of the Malt to be dried is a material Conſideration, for that Kind will do for one that will not for another; and when the moſt expeditious can be uſed, without Hurt to the Malt, there is ſomething worthy Conſideration in the ſaving of Fewel.

Thoſe which do with the leaſt Fewel are the Iron-plate Frame and the Tile Frame: they were invented for this Purpoſe, and are a ready and cheap Method. They dry the brown Malts very well, but they will by no Means anſwer for the pale Kinds.

None of the Methods heat the Malt ſo violently as theſe, the Corns often jump like parched Peaſe, and crack: but they get a fine brown. It is a cheap Way of drying; but let the Farmer ſee he is not deceived in it, eſpecially if he be to buy Malt of this brown Sort. The Nature of it is to look dry, and it is not the worſe for that; but thoſe who ſell it, frequently ſprinkle Water over it, which it receives freely, and this makes it ſwell up vaſtly. 'Tis fairer to the Eye, but this is a Trick that takes away a great deal of its Sweetneſs.

People find the brown Malt dried this Way apt to ſpoil in keeping: but they accuſe the Machine when the Malſters are in Fault: all the Damage they find in the Malt is owing to the ſprinkling Water over it; which they are apt to do on all Occaſions, to make their Work appear well; and this ſubjects it to decay in keeping. Brown Malt, dried on one of theſe Frames, will keep as well as any, if it be ſpread to cool as ſoon as made, and no Tricks be play'd with it.

All the real Damage it is ſubject to is, contracting ſomething of a Bitterneſs by burning; and this owing to the Careleſſneſs of the Maker, more than the Fault of the Frame.

This Careleſſneſs of ſome, and the Tricks of others, have brought theſe Methods of the Plate and Tile Frame out of Faſhion, but without any real Cauſe. They are fit only for brown Malts in their Nature, but in a fair and proper Management they dry theſe as well as any other of the Methods, and much cheaper.

The Wire Frame comes next in Degree after the Plate and Tile ones, and it is generally uſed in their Stead. This dries the Malt more gently and leiſurely; but there is ſome Difficulty in the turning it, and cleaning the Bottom.

Of all the Methods that have been invented, the plain and ſimple Hair Cloth is the beſt for nice Work, and the fineſt Malts. A ſlow Fire under this dries it very gradually and equally, it is eaſily turned as is required, and when it is done there is no Difficulty in getting it

it out, for 'tis only turning it at once and all is clean and clear.

CHAP. III.

Of the Fuel to be uſed in drying Malt.

WE have ſhewn the Farmer by how many ſeveral Ways Malt may be dried in Reſpect of the Frame, and there is alſo a great Variety in the Article of Fewel, which he muſt conſider in the ſame Manner: ſome Kinds being cheaper, ſome dearer; and ſome better, others worſe. However this is not ſo abſolute a Character, but that ſome of thoſe which are bad for the drying certain Sorts, may be very proper for others.

The principal Kinds of Fewel, including the Practice of the ſeveral Parts of the Kingdom, are five: 1. Coak; 2. Welch Coal; 3. Straw; 4. Wood; and 5. Dry Fern or Brakes.

The Farmer will underſtand that what is to be done by this Fewel is to dry the Malt, and nothing more. No Flavour is required from it, and therefore the purer the Fire is, and the cleaner the Malt is dried by it the better.

All Smoak muſt be wrong upon that Conſideration; and therefore all thoſe Fewels that yield a great deal of Smoak, are to be rejected in the drying at leaſt of the nice Malts.

Upon this Conſideration the Farmer will perceive, that Fern muſt be a very bad Fewel for this Uſe: and at firſt Sight a Perſon might join Wood and Straw under the ſame Denomination, becauſe of the Quantity of Smoak that riſes from them in burning: but there is in this a Difference. All Smoak is an Enemy to Malt; but there are Varieties, and thoſe very great ones, in the Taſte and Flavour of the Smoak of different Materials. Thus the Smoak of Fern is not only vety plentiful, but of a very ill Hogoe, which it will communicate to the Malt. And on the other Hand, the Smoak of Straw, though almoſt as plentiful as that of Fern, is ſo ſweet, that it ſcarce does the Malt any Damage. The Smoak of Wood is of a middle Nature between both, not ſo ſweet as that of Straw, nor ſo rank as that of the Fern.

Thus dividing our Fewel into two general Kinds; the Coak and Welch Coal being the beſt, and the Straw, Wood, and Fern the inferior, we have here the Degree of Goodneſs of theſe latter three; the Straw is the beſt of them, the Wood the ſecond, and the Fern the worſt.

There never can be a Neceſſity of uſing Fern on this Occaſion, therefore it ought wholly to be excluded from the Malt-houſe. As to Wood it may always be had, and muſt be better than Fern; and for ſome of the ordinary Malts it is a cheap Fewel, and anſwers very well. Straw, with good Management, may be made to do for any but the very beſt and niceſt Kinds.

With Reſpect to the other two Coak is the beſt; but the other is very good.

We adviſe the Huſbandman to uſe Coak, if it is to be had; but let him ſee that it be good and well made: for otherwiſe the inferior Fewels may do better. Fine Coak is made of large Pit Coal charr'd, or burnt to a Cinder. It is to be burnt till all the ill Smell is conſumed, and no Smoak riſes from it; and in this Condition it makes the ſteadieſt and the ſweeteſt Fire of any Fewel whatever. It is a common Negligence to char this Coal imperfectly, but the Huſbandman who dries his own Malt ſhould examine ſtrictly into it; for one ſmoaky Piece will do vaſt Damage. He may ſee this by the Eye, for there is a particular dry Aſpect which Coak has when perfectly burnt, that is wanting in ſuch as has any of its groſs Parts remaining.

The next to pure Coak is Welch Coal: this is called by many Culm. It is a fine ſweet Coal dug naturally out of the Ground. It comes in thin fleaky Pieces, and burns to white Aſhes with a little Flame, and no Smoak, or very little. This brings it nearer to the Nature of Coak, but it is not altogether ſo pure: however, it is cheaper in many Places, and for all but the fine Malts will very well anſwer the Purpoſe.

Therefore let the Farmer, if he have Convenience, dry his own Malt, for out of this Variety of Materials it is poſſible the Malſter to whom he puts it may chuſe the worſt: in ſome Places it will not be worth while, becauſe every thing muſt be built for it, and that the Farmer may not think this proper, when he has a ſmall Family: but in other Places moſt of the Conveniences will be ready.

In the Hop Countries the ſame Kiln that dries Hops will dry Malt; and ſo on many other Occaſions: and wherever it can be done 'tis much beſt for him to do it at Home. As to a little Expence, let him conſider 'tis a thing for which there is a conſtant Demand.

I ſhall offend the Malſters; but I muſt add, that if he knew their Practices as well as I do, he would ſee more Reaſons than are here ſet down for doing his Buſineſs himſelf.

CHAP. IV.

Of the right Management of Malt, and Additions to it.

WE have obſerved, that to have perfect good Malt the Barley muſt be in perfect Order; and in this Reſpect the ſweating in the Mow is a great Article. Nature intends ſome ſuch Practice in the finiſhing of all vegetable Juices. We find that Apples carried from the Tree to the Preſs make a poor raw Cyder; and 'tis the ſame with the Barley: as the Apples muſt lie in a Heap, the Barley muſt be packed ſome Days in the Mow. I have known ſome Farmers, to ſave Trouble and Time, thraſh their Barley from the Cart which they intended for Malt; and I have ſhewn them the Effects of their Error. The Malt has been poor, ſteely, and hard, in ſpite of all the Care in making; and no Art whatſoever could brew good Beer with it.

Pure Malt requires no Addition for the making of fine Beer, but Fancy or Curioſity have led People to make it various Ways, and ſome not amiſs.

A ſmall Quantity of Oats are added by ſome: but 'tis a Practice I cannot approve. The firſt

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Invention of this was owing to a Suſpicion of the Malſter. A Farmer who had been careful of his Malt Corn would put in the Oats, that it might not be changed: and as a very ſmall Quantity anſwered for that Purpoſe, there was not much Harm. But when thoſe who did not underſtand the Reaſon of it came to put in more by Way of an Improvement of the Drink, the Error was ſoon ſeen. As to this Practice all to be ſaid is, Oats hurt the Malt; ſo the leſs of them the better; but ſo much as will anſwer the Purpoſe of preſerving it to the Owner, may be done without any great Harm.

Others mix Beans or Peaſe with their Barley for malting. This ſeems a more unnatural Addition, but I have known it anſwer very well: ſuch a Kind of Malt, ſuppoſing it to be well made, and of a very good Barley, will make a mellower Drink than any other.

A very ſmall Quantity anſwers the Purpoſe of this Addition, a Peck and half of either is enough for five Quarters of Barley; and Peaſe anſwer the beſt. The Taſte and Qualities of both are much the ſame, but the Peaſe come better, and mix more conveniently with the general Quantity.

Though the Farmer may thus make ſome Additions to his Malt, he muſt be very careful that none are made by Accident for him. We have ſpoken at large of cleaning the Corn, in a preceding Part of this Work, and ſhall obſerve to the Huſbandman here, that there is no Occaſion which requires it to be ſo perfectly pure as this of malting.

The Seeds of many Weeds will get in among it, and ſome of theſe are very hurtful. 'Tis ſaid the Seeds of Cockle give the Beer an intoxicateing Quality, and in ſome Places Melilot is a common Weed in Corn Fields. This is a moſt miſchievous Addition to Malt Corn; for the Seed of Melilot is a very ill taſted, and a very ſtrong taſted one. It gives a diſagreeable Flavour to the Beer, and no Art can remove it.

Tho' Oats mixed with Barley hurt the common Kinds of Drink, yet they may be malted alone, and will make a very pleaſant Liquor; what is called Oat Ale, where genuine, is made of them, and it is then a ſoft and mellow Drink, not ſtrong, but very pleaſant.

Malt may alſo be made of Wheat, and a very ſtrong and very fine Kind of Drink is to be brewed from it: but this is a Concern the Farmer has no Buſineſs with.

Whichever Way Malt is made it anſwers the ſame Characters, if the Work have been well performed; and there are Methods of knowing by Trial, whether it be well made and in good Order or not. 'Tis fit our Farmer know them, that he may be able to try both his own Malt, and that he buys.

A fine Malt ſhould be full of Flour, mellow within, thin ſkin'd, and of a pleaſant Smell. The ſureſt Way of trying is by biting a Corn of it croſs-wiſe.

Another very good Method is to try it by Water. This Trial depends upon the following Principle. Barley, in its natural State, ſinks in Water; but malting, when it is well done, makes it ſo light that it ſwims. Therefore to try whether it be well made, let ſome fine whole Grains be picked out and put into a Glaſs of Water. If the Malt be mellow they will ſwim, if but imperfectly made they will ſink like raw Barley. The Corns muſt be perfect for this Trial, otherwiſe the Water will get into them, and they will then ſink, though ever ſo good.

The Lightneſs in the Hand is alſo a good general Way of trying: and alſo the drawing it carefully acroſs a Board; for good Malt will mark it white.

The Farmer will, by theſe Inſtructions, know how to make or buy good Malt, and we ſhall now tell him how to uſe it.

CHAP. V.

Of the Kinds of Malts and Waters.

TO lead the Huſbandman on to the practical Part of brewing, we ſhall firſt lay down a few Hints reſpecting the Nature of the Ingredients. Malts, ſuppoſing the Barley to have been equally good, may be divided into three general Kinds, from the Method of making: theſe are, the Pale, the Amber, and the Brown.

The Pale has a great deal of Time, and a very gentle Fire in drying; the Amber has a middle Degree of Fire, and a moderate Time; the Brown is the quickeſt dried of all.

The Pale is the richeſt, and it ſells for the beſt Price: it may be brewed with Well Water, but the others requſire ſuch as is ſofter.

The Amber is an excellent Kind of Malt, and the beſt Way of brewing it is with a Mixture of hard and ſoft Water.

The Brown is the higheſt dried, and requires River Water.

Theſe ſeveral Kinds of Malt may be dried with any Kind of Fewel, becauſe it is only moderateing the Degree of the Fire, according to their intended Nature; and it is always beſt to give the ſweeteſt to that intended to be the fineſt Malt.

Pale Malt ſhould, for this Reaſon, always be dried either with Coak or Culm, and the firſt is much the beſt.

The Amber may be Straw dried, but 'tis not nearly ſo well. As to the Wood and Fern they are uſed in ſome Parts of the Kingdom, and Cuſtom makes the People reliſh the Beer brewed from ſuch Malt; but to a Stranger there is a moſt nauſeous Taſte of Smoak in it.

The common Practice is to brew ſome one Kind of Malt alone; but the mixing half Brown and half Pale, is a Way to make a very ſound, pleaſant, and wholeſome Drink.

With Reſpect to Waters they may be ranked under four Kinds, Spring, River, Rain, and Pond. We have obſerved that Spring Water is very proper for the pale Malts; but let it be ſuch as is pure. There is a great deal of Spring Water impregnated with various Subſtances, as Salt, Allum, Iron, and the like. All theſe are improper for the common Service of Brewing. Some uſe them indeed for Medicinal Purpoſes, brewing Drinks with them that it may

have their ſeveral Virtues, but this is not what we ſpeak of here. We are informing the Farmer how to brew good Beer, and not how to make Medicines.

River Water is in general the beſt of all for Brewing: but to be in Perfection it ſhould be ſuch as is not near the Head of the River, becauſe that will be of the Nature of Spring Water; nor near great Towns where Filth is thrown in: and to be nice in having it in the greateſt Perfection, it ſhould not be uſed after great Rains when it is thick and muddy.

Clear River Water is ſoft, and the fineſt of all: it is naturally pure, as riſing from a Spring, and it has been ſoftened by its Motion, and by the Effect of the Sun and Air.

River Water in general takes out the Virtue of the Malt better than Spring Water; and the Difference is ſo conſiderable, that about one ſeventh Part more Malt is required to make Beer of the ſame Strength from Well Water and from the other.

Rain Water is the ſofteſt of all; and makes the ſtrongeſt Liquor from an equal Quantity of Malt: but the Beer made from it does not keep well. It is therefore fitter for Ales that are to be drank ſoon, than for Beers that are for Continuance.

Pond Water, when pure, is very good for Brewing, but where Cattle come in and diſturb it, and where there are great Numbers of Fiſh it is never clear. In this Caſe it neither makes a pleaſant Drink, nor takes out the due Strength of the Malt. When Pond Water is in its Perfection it is of a middle Nature between Rain and River Water; but in Places where it is made foul by the before-mentioned Accidents, it is worſe than any.

CHAP. VI.

Of Brewing in general.

THE Farmer having, according to theſe Directions, prepared or purchaſed his Malt, and fixed on a proper Kind of Water for it, is to proceed to Brewing.

His Malt is firſt to be ground, and let him give Orders that this be done moderately. It ſhould be only cracked, and in general ſhattered in the Mill. This is ſufficient, for the Water will in that Caſe thoroughly take out its Virtue; and if it be broke more it will not anſwer ſo well in the Brewing.

Many deſire their Malt to be ground very fine, thinking it by that Means anſwers better in giveing out its Strength; but in this Caſe it mixes with the Water inſtead of impregnating it with its Virtues; and the Wort runs thick, and the Brewing goes on coarſely.

Let the Farmer always have his Malt ground ten Days before the Brewing. This is the moſt eſſential to the brown Malts, becauſe it takes off the fiery Taſte they got in their high drying; but it is of great Uſe to all. The ground Malt muſt be kept in a dry Place, and it always mellows in lying. The paler the Malt the leſs Time it needs lye after grinding. In the LONDON Way of Buſineſs it is not eaſy to give the Malt this Advantage, becauſe they brew ſo frequently and in ſuch Quantities, therefore the Family Brewer has in this Article an Advantage. In general about eight Days may be allowed to the pale Malts, and from ten to twelve or fourteen to the brown.

The Malt thus ground and kept is ready for Uſe, and we ſhall lead our Country Farmer into the Practice, by giving him a general Idea of what is the Method in LONDON, where there are perhaps the moſt underſtanding Brewers in the World.

Four Kinds of Beer are in general brewed in LONDON, Stout, common Butt-Beer, Ale, and Small Beer.

Stout is the ſtrongeſt Beer, brewed from brown Malt; and is ſold for forty Shillings the Barrel, or ſix Pound the Butt, from the wholeſale Cellar.

To brew this, the Water in the Copper for the firſt Marſh is made to heat ſoon, by pouring in a couple of Buſhels of huſky Malt, juſt to ſpread over its Top.

The Degree of Heat to be given this is the utmoſt that the Hand can endure, but it muſt not boil.

When it is in this Condition the Fire muſt be damped, and the beſt Way is by throwing on a good Quantity of freſh Coals. Then cold Water is to be let in till the whole is juſt Blood-warm. The Malt is then to be worked in with Oars, half an Hour, and this is called the Stiff Maſh.

While this is beating up more Water is boiling in the Copper. This is to be let in: and the whole being maſhed again, and well mixed, ſome Baſkets of Malt are thrown over it, and it ſtands an Hour.

At the End of this Time it is let out into the under Back; and is then boil'd an Hour and half. This, with the due Quantity of Hops, is the Stout.

The common brown Ale, or as they call it ſtarting Beer, is made in the ſame Manner as the Stout; but a larger Quantity is brewed from the ſame Portion of Malt. After the ſtiff and ſecond Maſh they cap the whole with freſh Malt and boil it an Hour, and after this Small Beer is made of it. The Difference between brown Beer and brown Ale is only that leſs Beer is made, and it is boiled longer and has more Hops, proportioned to the Time it is intended to be kept.

The pale Beers are brewed in the ſame Manner, only Pump Water is uſed, and it is made hotter at firſt, and lowered to be almoſt cold afterwards.

The Small Beer in LONDON is made thus. They heat the firſt Water with ſome hully Malt over it, and when it is of a due Heat they let in ſome cold, and run it into a Tun Milk-warm. The Malt is maſhed in this; and then the ſecond Quantity of Water is let in, which is ſcalding hot. It is to ſtand an Hour, and then be run off into the under Back.

This makes one Copper of the firſt Wort without putting any freſh Malt in. The next Liquor is to be Blood-warm, then hot, and then laſtly, cool.

This is the great Secret of the LONDON Brewing. Their Beer has a very great Advantage from the Quantity that is brewed together; and there is a great deal of Art in putting in the firſt water Blood-warm, and the Reſt hot: for this warm Water opens the Malt beyond any other Practice, and makes it ready to receive, and yield all its Strength and Virtues to the hot.

The Quantities we have not named in the Courſe of the Brewing, reſerving them for a diſtinct Mention here by themſelves, the Strength alone depending on that Article.

The Allowance for Stout Beer is a Quarter of Malt to one Barrel; and this is ſold from the Tap at thirty Shillings. The Proportion for the common Brown Ale is a Quarter of Malt to a Barrel and Half. For entire Small Beer the Allowance is a Quarter of Malt to ſix Barrels; tho' ſome allow a Quarter to five. The Allowance for Pale and Amber Ale is a Quarter to a Barrel and a Firkin.

Thus have we laid before the Country Farmer the general Proportions and Method of working in the LONDON Brewhouſes for their various Kinds of Drink; and from this general Idea of the whole Art, and the Particulars of the ſeveral Kinds premiſed before, he will be able to comprehend the whole Theory, Art or Myſtery of the Buſineſs, and may ſafely and ſucceſsfully enter on the Practice.

CHAP. VII.

Of brewing for a private Family.

TO ſpeak with Certainty, and in a determinate Manner on this Article, we muſt firſt eſtabliſh ſome regular Quantity intended to be brewed; and ſome regular Size of the Veſſels.

We will ſuppoſe that the Farmer has a Copper, which, when filled to the Top, holds a Barrel, that is, ſix and thirty Gallons; and we will ſay he is to brew five Buſhels of Malt. He has this in the Houſe, it has been ground a proper Time, and there is nothing to be done but to put to it the Water proper of its Kind.

Let the Water be ſet on in the Copper, and when it is pretty hot pour upon it Half a Peck of Malt. This will keep in it Spirit, ſoften it, and purify it, and make it heat regularly. When it begins to boil ladle it out into the Maſh Fat, and there let it ſtand about a Quarter of an Hour.

It is often the Neceſſity of the Farmer to uſe but indifferent Pond Water in Brewing. In this Caſe let him pour Half a Peck of Bran upon it inſtead of the Malt, and when it boils ſkum that off. It will take the worſt Foulneſs of the Water with it; and is to be given to the Hogs. In the other Caſe, when the Water is tolerably pure, the Malt is to be uſed as mentioned already; and this is not to be ſcummed off, but to be ladled out with the Water.

When it has ſtood about the Time mentioned, the Steam will be but little, and the Farmer may look down into it and ſee his Face in it. This is the Country Rule, and it is a very good one; for he cannot ſee it while the Steam riſes thick, as it does from the hot Liquor. Separate Half a Buſhel of the Malt, and let the Reſt run ſlowly and leiſurely into the Liquor when it is of this Warmth; let it be well ſtirred about as it runs in, and ſo mixed when all is together, that it does not lie any where in Cakes or Lumps.

It is a common Practice to beat and ſtir up the Malt in this firſt Maſh into a Haſty Pudding, but this is very wrong: the whole Brewing always ſucceeds better when it is in this Manner only well mixed together without ſuch Beating. It receives the hot Water the more freely and perfectly, and gives Strength to it in a very fine Manner.

When the Malt is thus thoroughly ſoaked, the hot Water is to be ladled on by Bowls full, and it is to be ſuffered to run out at the Tap in a very ſmall Stream, not thicker than a Straw. In this Manner, as the Malt has not been maſhed to Pieces in the Water, the Liquor will run off very clear, and will yet have the full Strength and true Flavour of the Malt, according to its Kind; and will much ſooner be fine than in the common Way of Brewing.

This is the Method to be taken when the Farmer is for brewing a good Ale, and will make his Small Beer ſeparately, or leſs regards it: but when he minds the Small as much as the Strong, the ſecond Copper of Water muſt be poured on quick, and ſuffered to run off in a large Stream. This will make a good bodied and well taſted ſtrong Beer, and yet there will remain in the Malt Virtue enough for impregnating the Small.

When the firſt Stirring of the Malt is done, let the Half Buſhel that was ſaved out be carefully ſpread over it; and then let ſome Sacks, or other Covering, be put over the Tub to keep in the Steam.

The whole is to ſtand in this Way about two Hours and a half, and in that Time the ſecond Copper of Water is to be made boiling hot.

This is then to be poured on either briſkly or ſlowly, as we have directed, according to the Deſign of more or leſs Small Beer; and when it is in, let as much run off from the Tap as will very near fill the Copper.

Put half a Pound of fine ſweet Hops in a Canvas Bag, and putting them into the Copper boil them half an Hour: then take them out; and ſome freſh ones are then to be put in and boil half an Hour. The Quantity of Hops muſt be greater for Beer, and leſs for Ale.

If the Beer be intended for keeping, half a Pound of freſh Hops ſhould be put in every half Hour, and the whole boiled briſkly for an Hour and an half.

While this firſt Copper of Wort is boiling, ſome ſcalding hot Water muſt be poured in upon the Malt, Bowl by Bowl; and thus ſo much is to be got in and ſuffered to run off again, that there may be the Quantity of another Copper ready for boiling, by that Time the firſt Quantity is boiled off.

When this is drawn off the ſecond Running muſt be put in and boiled an Hour, with nearly the

the ſame Quantity of Hops as at firſt; and while this is doing, Preparation may be making for Small Beer, by pouring on ſuch a Quantity of Water as the Farmer chuſes cold upon the Grains all at once, or at twice.

This muſt be boiled up in the Copper in the ſame Manner as the Ale Wort, and muſt have the Hops that were boiled before. Each Copper of the Small Beer ſhould be allowed an Hour in boiling. In this Manner five Buſhels of Malt will make the Farmer a Hogſhead of Ale, and the ſame Quantity of Small Beer; or if he chuſes otherwiſe, his Ale will be much the ſtronger and better.

Each Copper of Wort muſt be ſtrained off through a Sieve, and cooled in four or five Tubs.

The Farmer will find a Hogſhead of Ale in this Manner made from five Buſhels, a very pleaſant and ſound Drink: if he chuſes to make it ſtronger, and for keeping, he muſt boil off only the one firſt Copper for Ale, and the Reſt all for Small Beer; which in that Caſe will be of a very good Strength.

The Farmer will ſee that in this Method, although very different from the LONDON Brewer's Practice, yet all that is valuable in that Art is preſerved. He may, if he pleaſes, imitate their Methods, by putting in more Malt after the ſecond Maſhing; and thus running off, according to his Pleaſure, a larger Quantity of ſtrong or of ſmall Beer: but this is getting into a confuſed and perplexed Practice. The other is plain, familiar and eaſy: and we may affirm upon repeated Experience, that whoſoever follows it, punctually will brew to his Satisfaction in every Reſpect, for the good Flavour and the Strength of his Beer.

CHAP. VIII.

Of the Advantages of brewing at Home.

WHAT we have here propoſed to the Farmer we would recommend alſo to every middling Family; and that for more Reaſons than will at firſt be thought. The Difficulty upon this plain Receipt for doing it is nothing; the Time required is only a few Days in a Year, and the Inconvenience is not much: the Advantages are very many. The ſaving in Money is very near half in half; and the Houſekeeper is ſure that nothing but wholeſome Ingredients have gone into the Liquor, which he never can pretend to know if he buys it of a common Brewer.

Moſt People have been deſirous of brewing at Home, but they have been deterred from it, partly by their thinking there was ſome great Myſtery and Secret in doing it well; and partly that there required a great deal of Room, and a great many large Veſſels, for the brewing but a moderate Quantity of Drink.

We have ſhewn this to be entirely an Error in both Reſpects. The Secret is in a Manner nothing, a few plain Words have deſcribed it; and in this Method which we have laid down, a moderate Copper, and a few common Veſſels anſwer the Purpoſe of brewing a Couple of Hogſheads.

We have only to add on this Head one general Caution, that Cleanlineſs be obſerved in every Thing relating to a Brewery. We have ſhewn the Neceſſity of it in a Dairy, and the Brew-houſe is the next Article to that, requiring it to be obſerved with Strictneſs.

Many who brew at Home, find their Beer that was not at all faulty at firſt, contract ill Taſtes, and grow very bad after a little Time; and they little ſuppoſe how much this may be owing, and how frequently it is, to the Careleſsneſs of keeping the Brewing Veſſels.

In Families where the Brewing comes ſeldom, the Utenſils are laid by careleſsly; and the Conſequence of this, eſpecially if there be any Damp about them, is, that they grow mouldy or muſty.

When Mouldineſs is ſeen, there is a natural Caution for the cleaning it away; but there will be Muſtineſs when there is no Mark to the Eye: and Servants are often ſo negligent, that they ſeem to have the Senſe of ſmelling given them to no Purpoſe.

We adviſe whoever intends to brew at Home, to look carefully himſelf into this Article. Let a Copper of Water, or two if needful, be boiled ſeveral Days before the brewing, and let the ſmaller Utenſils be boiled in it; and the larger well ſcalded with it. Let them all be thoroughly and perfectly cleaned after the Scalding, and then ſcalded again: after this let them be expoſed to the Sun and Air, ſo as to bleach and perfectly ſweeten, but not ſo as to crack them; and after this let them be ſet by for Uſe.

If every Thing be thus conducted, the Malt ſuited to the intended Kind of Liquor, the Water to the Malt, and the Quantity duly proportioned: if the Working be carefully heeded, and the Veſſels clean, there can be no Doubt of the Whole ſucceeding to Credit and entire Satisfaction.

BOOK XI. PART II.

Of CYDER.

INTRODUCTION.

WE have gone through the general Account of the natural and artificial Products of the Farmer's Stock, and might here close that Part of our Undertaking: but as the Husbandman should never be without an Orchard, and as we would have him make every Part of his Ground turn to some Account, we shall advise him to make Cyder from the Produce of his Apple Trees.

Under this Head we are very happy, that we have an Opportunity of communicating to the Publick a Method, of raising this BRITISH Liquor to an Excellence which few know it can reach, and which renders it equal in Value to many Wines. This we receive from a Clergyman; a Gentleman of eminent Knowledge and distinguish'd Candour; and we have Authority to assure the Publick, that it contains nothing but the Result of Experience; that nothing is directed to be done, but what the learned and reverend Author has himself frequently practised, and does at this Time practise; and that the Result is his having Cyder superior to any other Person; and for which he has been offered in Exchange Quantity for Quantity of very valuable Wines.

As this is a Method never published, and the Account in some Parts refers to Things commonly known in the Cyder Countries, though they may be strange to the Reader in general, we shall prefix to it an Account of the usual and received Way of making this Liquor.

Those who chuse to practise the old Method, will therefore in this Place have full Directions for doing it; and those who shall follow our Advice, and attempt it upon the Rules prescribed by this valuable Correspondent, will, by having gone through the other Account first, perfectly understand every Process and every Part mentioned in this.

It is proper, in order to trace this Subject from the Beginning, to instruct the Farmer in this Place to plant his Orchard rightly. This falls very well in with our Plan in the present Work, the Intent of it being to instruct the Farmer in every Part of his proper Occupation. This is indeed a Subject we shall hereafter pursue through all its Branches, being determined to publish, after this Work is finished, a Compleat Body of Gardening in the same Form. The specious Appearance of other Works already extant under the like Names, is to us no Discouragement in this Undertaking; because partly the Papers in our Possession, many of which we find relate to Gardening, and partly our own Experience, have shewn us, that the most popular of those Works abound with Errors.

The same Hands which have compiled this Body of Husbandry, intending therefore to continue their Labours with the same Assiduity, to finish from the like Materials and the like Experience a Body of Gardening, we shall not on other Articles, confound or perplex the Reader, by mixing together two Considerations so naturally separate; but shall reserve to that succeeding Work what Directions we have to give with respect to planting Fruit Trees of other Kinds. Here we shall treat only of the Apple; and under that Head, in the usual Course of our Work, and according to our accustomed Method, we shall first teach the Farmer to plant an Orchard, and bring it to a bearing Condition: we shall then direct him, according to the usual Practice, to make the Advantage of Cyder from his Fruit; and afterwards lay before him these new discovered Methods for improving that Liquor.

CHAP. IX.

Of chusing a Spot for an Orchard.

ALL that we direct the Husbandman to practise is, with a View of Profit. His Orchard we do not look upon as an ornamental, but useful Part of his Concern: and far from limiting it to the trifling Services of the Fruit at his Table; we intend it as the Source of very considerable Advantage in the Article of Cyder, which we shall give him the usual Rules for making, and afterwards these others, hitherto unpublished; which are vouched upon the most certain Authorities, Experience, and the Testimony of others of Knowledge.

If the Husbandman finds an Orchard upon his Farm, tolerably planted, and in a good State of Growth, he is to make the most of it in the Way we shall direct hereafter. If there be none, let him by all Means plant one; if he be fixed for a Continuance: and let the Land Owner never omit that Article. When the Orchards already planted begin to decay, this will be very well worth his while; and we shall here lay down the most profitable Method of doing it.

The first Consideration in the raising of an Orchard, is the Choice of a proper Piece of Ground. It is a Plantation that is to continue a great while, and that may be of very great Value hereafter, it is therefore worth while to be careful.

'Tis most convenient to be near the House, for the Advantage of gathering the Fruit, and for its Safety from their being stolen: but if there be not a proper Piece of Land near, it must be chose farther distant; for 'tis to no Purpose to have Convenience or Security where the Trees will not thrive.

Different Kinds of Ground will suit different Fruits; and if such a Soil as is suited to the particular Kind intended to be raised be not first carefully chosen, all the Expence and Care that

ſhall follow will breed only Diſappointment.

Let it be conſidered that Trees root deep; and accordingly let the Huſbandman extend his Regard to the Nature of the Ground, farther than to what appears towards the Surface. Of all Soils for an Orchard intended for Cyder Apples, there is none comparable to firm, rich Loam.

As to what lies under it, let the Huſbandman ſee that it be not a cold, tough Clay, nor a perfectly barren Gravel. Any other Bottom will anſwer, but in neither of theſe Caſes the Trees will ever thrive. In the Caſe of a tough Clay Bottom, the Roots will always be chilled, and the Branches covered in the Moſs: in Caſe of the barren Gravel, their Barks will crack or peel, and the top Branches will wither and ſhew what all the reſt ſuffer tho' leſs viſibly, that they are parched and ſtarved for Want of Nouriſhment.

The Depth of the good Soil is a very material Article, for Trees ſpread out Multitudes of Roots ſideways near the Surface; and the extreme Parts of theſe will fill all the good Soil be its Depth what it will: it is therefore of the utmoſt Importance that they be well ſupplied with Nouriſhment.

The next Article to the Soil is the Situation, for this is of great Conſequence; and he is happy who finds the Advantages of both together.

An Orchard ſhould neither lie on a Flat, nor upon the ſteep Edge of a Hill: if it lie in a perfect Flat the Roots will be chilled by too much wet, and it will want the Advantages of Sun and Air which higher Situations enjoy: and on the other Hand, if it be planted where the Deſcent is too great, little Wet will lie for the furniſhing the Roots, and the beſt Part of the Soil will be waſhed away from them.

For theſe Reaſons, the proper Piece of Ground for this Purpoſe is one that has a gentle Riſing: here the Sun and Air have free Paſſage among the Trees, and enough Wet will lie for the Benefit of the Growth, but not enough to do Hurt. In the abſolute Flats too much Wet lodges, the Conſequence of which is the chilling of the Fibres, if there be no Sun to evaporate it; and if there be 'tis often worſe, for the Quantity makes the Air foggy, and is the Occaſion of Blights and many other Miſchiefs; as we ſhall ſhew when we come to treat of that Matter.

Let the Huſbandman therefore underſtand, that if he can find near his Houſe a Piece of Ground that has a gentle Aſcent, where the Soil is a rich, deep Loam, and the Bottom neither is a cold Clay nor a bare Gravel, he is very happy in a Piece for an advantageous Plantation.

There are certain Advantages of Shelter from bleak Winds, and Openings to the milder Air, which that Piece of Ground is always to be valued that has; but as this may always be given by a proper Plantation, let the Huſbandman be ſure, that if Nature has not given it, his Care and Induſtry do. The North and North Eaſt Winds are thoſe which will be moſt miſchievous in the Spring, and very frequently a North Weſt in a more advanced Growth does great Damage; therefore let him plant in ſuch a Manner about his Orchard, that it be perfectly defended from theſe Quarters, the North, the Eaſt, and the Weſt; let it be open to the South to let in the Sun: and when all that is hurtful is blocked out, and all advantageous admitted in his Plantation, which before had all the Advantages of Soil and Situation, it will alſo have thoſe of Sun and Air.

The Trees that are to defend the Orchard will grow up with the others, and all will thrive as they ought; only let the Planter in this, as we have warned him on all former Occaſions, be careful not to run into one Diſadvantage by his Earneſtneſs in avoiding another: his Orchard is to be defended, but it is not to be blocked up. We have ſhewn the Diſadvantages of this to all Growths whatever; and it is in none ſeen more than theſe. While the Winds are kept off, there muſt be a clear and free Paſſage for Air; or all will come to little. This is to be obtained by planting the Trees intended for Shelter and Defence at proper Diſtances, and trimming them in a judicious Manner as they grow; leaving on Branches enough to break the hurtful Winds, yet not ſo many as to choak the Paſſage of the Air. The Fruit Trees themſelves muſt be planted alſo with a careful Regard to this Advantage.

CHAP. X.

Of diſpoſing the Orchard.

WE now enter on a Point leſs underſtood and worſe practiſed than any Thing in the Huſbandman's Profeſſion; but we ſhall endeavour to lay down ſuch Rules as will lead him into a better Tract. Let him obſerve, that we have ſaid a free Paſſage of Air is of the utmoſt Conſequence; it muſt have Liberty to go briſkly between Tree and Tree, and to carry up all damp Vapours with it, elſe they will deſtroy the Hope of the Planter. Let him firſt take Care of this in the planting his Timber Trees for Defence. If there be riſing Grounds towards the North Eaſt and Weſt, they will defend the Orchards without other Help; and when they are wanting, let him plant his Trees for this Purpoſe far enough from the Fruit Trees, that they be not choaked up by them.

The ſame Caution is to be obſerved, that the Fruit Trees do not choak one another. Moſt Orchards are planted much too cloſe. The Deſire of having a great deal of Fruit upon a little Ground is the Cauſe of this, but the Method they take defeats the Purpoſe. They do not conſider when an Apple Tree is planted to what an Extent its Branches will ſpread, or how far its Roots will run in the Ground. Let our Huſbandman take Care of this; let him give Compaſs for the Roots that the Trees do not ſtarve one another, and free Air Room for the Boughs, that there may be clear Space enough between thoſe of the ſeveral Trees at their utmoſt Growth for a Paſſage of the Air, Sunſhine and Winds.

We have, on many other Occaſions, ſpoken of the great Folly of cloſe planting, but in theſe Trees it is worſt of all: they ſpread farther, and they are to ſtand longer than others, ſo that 'tis an Error not to be remedied. We ſhall aſſure our Farmer, not on Reaſon only, but a careful Examination, that of the Orchards in general in moſt Parts of the Kingdom, if the Trees were but half as many, the Fruit would be a great deal more than it is from the whole. The natural Vapours of the Earth being pent up among cloſe planted Trees will occaſion Blights: but that is not all; the Perſpiration of the Trees themſelves is very great, and that joined with the Vapours from the Earth, will at the ſame Time hurt the Growth, and give an ill Taſte to the Fruit: the Sun is a very eſſential Thing for the raiſing a Cyder Apple to its right Flavour, and that is not to be had where the whole is kept in Shelter by the Covering of the Boughs.

The Huſbandman who has an old Orchard will do well to thin it by cutting away a great deal of the Heads of his Trees, that the Air may paſs more freely; but in the planting a new one, another Sort of Caution ſhould be uſed, for it is better to prevent than remedy.

We ſhall ſhew the Farmer that he would loſe leſs Ground by planting his Orchard very diſtant than ever ſo near. In the Common Way of near planting all the Ground is loſt for other Purpoſes; whereas, if the Trees be ſet at great Diſtances, it may be tilled as other Land, and will produce Crops in the ſame Manner; and theſe, far from impoveriſhing the Trees, will, by the Culture of the Ground, cauſe them to grow quicker, to flouriſh more in every Reſpect, and to laſt longer. We have explained in treating of the Horſehoeing Huſbandry, the vaſt Advantage of tilling the Ground while a Crop is upon it. This is a Benefit Trees will ſhare in common with other Growths; and what we are now propoſing is with Regard to them in all Reſpects the raiſing them by the Horſehoeing Huſbandry. The ſlight rooting Crops of Corn ſown in the Ground between them do them very little Harm, and the breaking and dividing the Land by Tillage for theſe Crops enriches them prodigiouſly; ſo that the Advantage is many Times greater than the Damage.

This then is the Plan upon which we adviſe our Farmer to begin his Plantation. He has choſen a Piece of Ground of proper Condition, and of ſufficient Extent: it is defended properly, and yet open to the beſt Influences of the Air. All this ſerves for the Advantage of the Corn as well as the Trees; and let him conſider the Piece therefore as a Quantity of arable Land as well as an Orchard. This Caution only is to be given him, that he ſow upon it none but the ſlight and ſhallow rooting Crops, as Corn, the Pulſes, and the like: for the others would interfere with the main Deſign, and be every Way improper.

His Ground being thus choſen, let him make a Plan of it upon Paper, and mark the Places of his Trees. Let him diſpoſe them in regular Rows; and let theſe Rows be thirty Yards aſunder; and the Trees twenty Yards from one another in the Rows.

Such a Plantation will have all the Advantages an Orchard poſſibly can enjoy. It will bear as much Fruit as it will be poſſible by any Art to obtain from an equal Quantity of Ground; and all the Time the Farmer will have the Benefit of it as ſo much Land like the Reſt. In the firſt Year every Foot of it will bear as well as any other Ground; and when the Trees are fully grown, he will only loſe the Advantage of a ſmall Spot round each, which therefore it will be prudent in him not to ſow: the Ground will all bear, except juſt under the Shadow of the Boughs.

CHAP. XI.

Of making the Plantation.

THE Farmer having thus eſtabliſhed in his own Mind, what is beſt for the planting his Ground, and to avoid Forgetfulneſs or Miſtakes, having drawn the Plan of his intended Orchard on Paper, which indeed it requires no great Skill to do, he is to proceed to put this in Execution.

We will ſuppoſe it Spring, and the Ground he fixes upon to be a Piece that is in Paſture: let him not count ſo much upon the Profit of the Summer's Graſs, as to defer the Work till it is got in or eaten off; this is a ſmall Advantage in Proportion to what he is about. Therefore early in the Spring let him plow it up, turning the Turf in that it may rot. Three Times in the Summer, at equal Diſtances, let it be plowed over again, to break and divide the Soil, to tear the Turf to Pieces, and to prevent the Growth of Weeds. The laſt of theſe Plowings ſhould be toward the End of September; and this ſhould be a very deep one, that the Ground may be prepared for the Reception of the Trees.

There are two Seaſons for planting the Trees, and the Farmer ſhould take no certain Reſolution in Favour of one or the other; but be guided by the Weather, and the Nature of the Ground.

If the Soil be dry, and the Autumn favourable, any Time in October the Trees may be put into the Ground: but if the Weather be extremely rainy, and eſpecially if the Soil be inclined to Wet, then the beſt Seaſon is the ſecond Week in March.

As to the Choice of the Trees, the great Article regards their Age: for in this many have run into a very material and very miſchievous Error, by the planting them too large. It is certain, that an Apple Tree may be removed when of a conſiderable Growth, and that it will bear very well after it; but it will neither bear ſo well, nor continue ſo long, as when planted young.

The beſt Age of a grafted Apple Tree for planting as a Standard, is at three Years from the grafting; and for this Uſe they ſhould always be choſen upon a Crab Stock, for none is ſo laſting.

Let our Farmer examine the Ground from whence he has them: by no Means let him take them from a better Soil than his own: if he can have his Choice, let them be ſuch as have ſtood

on a Ground like his, but not ſo rich: their tranſplanting them will be natural, and they will at once take to the Land, and thrive apace in it.

Let a Stake be ſet up at every Place where a Tree is to be planted, and a large Hole opened for its Reception: let the Earth that is thrown out be well broken, and laid ready to put in when the Tree is ſet. A great deal of Hurt is done in theſe Plantations by the Holes not being made large enough, and by the Earth being thrown in careleſsly: when that is large, and the Ground that fills it is well broken, and is ſpread regularly, and ſettled by a gentle Watering, the Tree roots itſelf at once, and grows without any Check from the moving.

It is always beſt, when it can be done, to buy the Trees from a Nurſery at a ſmall Diſtance from the Place where they are to be planted, that they may not ſuffer by being kept long out of the Ground: and on all Occaſions the more Expedition is uſed in planting them the better; for they get Harm by the Air coming to their Roots.

When the Trees are thus brought into the Ground, one is to be laid by the Side of each Hole; and both the Roots and the Heads are to be pruned before they are put in: the beſt Way is to prune the Roots as the Tree lies, and the Heads as ſoon as it is planted: for the treading about the Roots in doing this afterwards, and the gentle ſhaking it gets in the handling, help to faſten and ſettle them, and the watering coming on upon that compleats it effectually.

In the pruning of the Roots the firſt Care is to look if any be bruiſed or injur'd in the taking up or Carriage; ſuch are to be cut off a little above the bruiſed Part: after this let the Courſe and Manner of growing of thoſe which are left be examined: it often happens that they croſs one another, cruſh one another, and are thus very hurtful: in this Caſe one of the two muſt always be cut off juſt above the Place; and when the larger Roots are thus regulated, the Fibres muſt be pruned. Theſe muſt all have their Ends cut off; and it ſhould be done juſt before the putting them in the Ground, for the Air always takes an Effect upon theſe ſlender Parts very ſuddenly.

If there be any decayed, mouldy or rotten Roots, they are to be cut off in the ſame Manner; for it is a Damage that ſpreads, and will infect the ſound ones.

All being thus ready, let ſome of the fine broken Mould be ſcattered in the Bottom of the Hole, and the Tree ſet on it perfectly upright, and not too deep: then let the Reſt of the Mould be thrown in a little at a Time, and the whole laid level and ſmooth at the Surface, when every Part of the Cavities between Root and Root has been filled up.

The Tree is now in the Ground, and the Head is the next Care. In old Time in England Gardeners were afraid of taking off the ſmalleſt Shoot from a new planted Tree: at preſent the Faſhion is oppoſite; the Gardener with his Knife is as terrible as the Surgeon with all his Apparatus of Inſtruments; and he thinks the more he cuts away the more he ſhews a maſterly Hand: both Extreams are wrong. Indeed what Extream is not!

The new planted Tree will not be able to ſupport ſo large a Head at firſt Setting, as it did while in the native Ground: but on the other Hand, if ſome be not left on, it cannot thrive. We have before acquainted the Huſbandman how eſſential Leaves are to Trees; and he will therefore plainly ſee the Folly of cutting them all off with the Branches.

What he is to do is to take off a Part, and to manage his Knife in ſuch a Manner, that what is left on may be of ſuch Growth as to form a well ſhaped Head.

When the Tree is thus planted upright, and reduced to a proper Shape and Size in the Head, it is to be ſecured from Damage by Winds by ſtaking. To this Purpoſe a ſtrong Stake having been driven down near each Tree, the Stem is to be tied to it with a Hayband, or ſome other ſoft Subſtance, that will not hurt the Bark.

This done, the Plantation is ſecure: the Huſbandman is to till the Ground between the Trees. They will grow up without his Care if the Seaſons favour them; if not it will be proper for him to water them at Times, both the firſt and the ſecond Year. The new Plantation will be ſtarved by being left too dry; but there is no greater Miſtake than the watering them too largely. In the firſt Caſe the fine and ſmall Roots ſhrivel up and wither; and in the latter they are all rotted by the Abundance of Wet.

We have ſpoke of laying Sones about the Roots of new planted Foreſt Trees, to fix them and to keep the Ground moiſt; but we ſhall here propoſe a better Method for theſe Plantations.

Let there be a good Parcel of Turf pared pretty thick from a Common, and brought freſh into the Ground, and let a Quantity be laid down by the Foot of every Tree. Let a Labourer carefully ſpread this round the Bottom of the Stem, laying the Turf Part downards, and then covering the Ground with it two Foot each Way from the Tree. This needs not ſet aſide the Uſe of watering, for it will make it anſwer much better, becauſe the Moiſture will be detain'd as long as it ought; and this Turf may be afterwards dug in as a Manure. This Kind of Plantation we ſhall explain in a Folio Plate, at the Cloſe of our Directions concerning Cyder.

CHAP. XII.

The general or common Method of making Cyder.

WITH Reſpect to the Choice and Kinds of Apples, their Mixture and peculiar Management, we ſhall refer the Reader to the ſubſequent Chapter. We are not here entering into Particulars, but delivering only the general Method, and univerſal Rules; that the Proceſs of Cyder making may be underſtood in itſelf, and conſequently the following Account be underſtood without Heſitation.

The Apples intended for Cyder muſt be picked clean, and their Juice expreſſed or ſqueezed out. The picking them is an eaſy as well as a needful Article; no Filth or Foulneſs

of any Kind muſt be mixed with them; and if there be any decayed ones among them they muſt be thrown away.

The picked Apples are to be put into the Mill, where they are maſhed and ground to Pieces by a Stone moved round upon them: this is the proper Method for large Quantities; but any Method of bruiſing and ſqueezing them thoroughly will do.

The Juice of the Apples being thus ſqueezed out, is to be caught in proper Veſſels, and as ſome Foulneſs will have come among it, it muſt be ſtrained. A tolerably cloſe Hair Sieve anſwers very well for this Purpoſe, or a Canvas Bag may be employed, or any other Contrivance that will let the Juice run freely through, and keep back the groſs Particles.

The Juice thus ſtrained from Impurities is to be put into a Veſſel, which muſt not be quite full. It is to be covered looſely, and ſet quietly by for three Days.

At the End of that Time it is to be covered up as tightly and cloſely as may be with Clay; and then the Buſineſs is to watch for its growing fine.

This is to be known only by trying from time to time. To this Purpoſe a ſmall Quantity is to be drawn out once in a Day or two, and examined in Point of Clearneſs. When it is ſufficiently clear, it is to be pierced for a more certain Examination of the whole.

In this Reſpect we are to inform the Farmer, that he is to conſider his Cyder according to the Nature of the Apples under three Kinds. Theſe may be named, according to the Apple; 1. The Summer Fruit Cyder; 2. The Gennet moil Cyder; and 3. The Redſtreak Cyder. Theſe have their three ſeveral Times at which they may be naturally expected to arrive at this Degree of Fineneſs: the Time of the Summer Fruit Cyder is about a Month: the Gennet moil Cyder ſeldom comes to it till toward the Beginning of October; and the Redſtreak Kind not till January.

Theſe are not to be ſuppoſed certain, invariable, and univerſal Rules, for there can be none ſuch. The Weather, the Temperature of the Air, and the Degree of Ripeneſs of the Fruit, all theſe ſingly, and two or more of them together, will naturally make very great Variations. Sometimes a Quantity of Cyder will be fine ſooner than could be expected: frequently it takes a Fortnight longer for the Summer Fruit Kinds, and a Month or ſix Weeks longer than the natural and uſual Time for the others.

In general the Winter Fruits of all Kinds are to be expected to anſwer in the Manner of the Redſtreak, and when after a Month, or at the utmoſt ſix Weeks more than the uſual Time, they are not grown fine, they muſt be racked off as clear as may be in the Manner of Wine.

Many Expedients have been uſed to fine down the Cyder that does not anſwer as it ſhould, but moſt of them are very improper. There is however one eminent Ingredient, that is of excellent Service to this Purpoſe, and may be uſed with perfect Safety. This is, Iſinglaſs. It is a very harmleſs Drug, and when diſſolved is of ſuch a clammy Quality that it lays hold of all Kinds of Foulneſs; and when the Fault is not too great will carry all down with it, and leave the Liquor perfectly fine.

As we have named this Ingredient, we ſhall inform the Farmer how he is to uſe it, for there is nothing ſo generally miſtaken. Iſinglaſs is brought from the Northern Parts of Europe, where it is made by boiling the ſinewy and ſkinny Parts of a Fiſh, much like a Sturgeon, to a Jelly; which is then poured out upon a Table to dry, in the ſame Manner as our Glue is made.

The common Method of the Country is not to cut it out into flat Cakes, as we do our Glue, but to roll it up into long Pieces, which they double together in the Shape of an Iron Staple.

This is the Shape in which Iſinglaſs comes to the Druggiſts, and they are ready enough to ſell it in this Form: but this is not the Way the Farmer is to buy it. Theſe large Lumps are very hard to diſſolve; but when it is beaten out into thin Shivers, it will melt in any Liquor that is not too ſtrong, without much Difficulty.

Water diſſolves it beſt, becauſe it has been boiled up in Water; but this is not the right Method for Cyder, becauſe the Addition of any Water will impoveriſh the Cyder, and therefore have a juſt contrary Effect from the fining of it; any thing that weakens a Liquor of this Kind naturally rendering it cloudy.

For this Reaſon the beſt Way is to diſſolve the Iſinglaſs for the preſent Purpoſe in a good bodied white Wine. As this is a ſtronger Liquor, the Iſinglaſs will not melt ſo freely in it, therefore there is the more Occaſion to buy it in a proper Condition. Let the Farmer who wants this Drug therefore, ſee that he aſk for beaten Iſinglaſs, and that it be well beaten into thin Shivers. Then he is to put it into the Wine for fining down the Cyder.

It will be fit for Uſe as ſoon as it is thoroughly melted, but not before: this is a thing that is done ſlowly: ſome haſten it by Heat; but that is not ſo well. If the Wine and Iſinglaſs be ſet over a gentle Fire, and kept ſtirring, it will in ſome little time melt, but thus the Wine loſes a great Part of its Spirit, and often the whole gets a burnt Taſte. This is to be guarded againſt in the moſt careful Manner; if the Neceſſity of the Farmer's Affairs make him uſe the Way with Heat; but the better Way is to take a proper Time, and let it diſſolve in the cold.

The fine beaten Iſinglaſs is for this Uſe to be put into a large Bottle, two thirds filled with Wine; and ſet by in a Cellar. It is to be ſhook gently from time to time, and by Degrees it will perfectly diſſolve, and the whole will make a fine Jelly. This Diſſolution is much more perfect than that with the Help of the Fire, and it always ſucceeds much better when put to Uſe.

When the Cyder is thus made fine by an innocent Addition, or when it has, in the common Courſe of Time, become fine of itſelf, it is to be drawn off at Pleaſure and bottled, if the Farmer chuſes.

This is the common Rule for making Cyder; and by this the Reader who had not before been acquainted with the Subject, will know the Nature of the general Practice. This being premiſed, we ſhall give the Reader the new Improvements of the Gentleman we have before mentioned.

CHAP. XIII.

The Reverend Mr. GEORGE TURNER'S *Method of making Cyder.*

AS we are here about to present the Reader with a compleat Treatise on this useful Subject, obtained from its Author at some Expence; and as we hope very well worthy the Publick Attention, it may not be improper to prefix to it what we have been informed concerning its Contents.

The first Notice we received of this Treatise was in a Letter from Mr. PENROSE, of PENRYN in CORNWAL.

This Gentleman acquainted Mr. OSBORNE, one of the Proprietors of this Work, that Mr. TURNER, Clergyman of that Neighbourhood, greatly respected for his Learning and Integrity, had written such a Treatise from his own Experience; which he apprehended might be procured for the Service of our Undertaking. Upon this Gentleman's acquainting the Proprietors farther, that the Author had lived many Years in the SOUTH HAMS in DEVON; that he had great Experience in the Subject, and his Rules, so far as they had been communicated to the Cyder-makers, had been greatly approved and followed; and that the Treatise itself, though never published, had received the Approbation of the late great Doctor MEAD, and had, at his Recommendation, been read before the ROYAL SOCIETY, and universally approved; he was requested to obtain it from the Author on any reasonable Terms, that a Piece of so established and authenticated Credit might not be lost.

In Consequence of this Commission we have been favoured with the Essay, which we here deliver to the Publick as it comes to us, with this additional Recommendation, that the Author of it, who lived fifteen Years near TOTNESS, and had always the Reputation of making the best Cyder there, had since his Removal into CORNWAL introduced his Method so happily, that the Cyder of that County, which never had been of any great Credit before his coming thither, is now advanced to such a Degree of Perfection, that the DEVONSHIRE People, of the most famous Cyder Places, acknowledge they have none equal to it.

We have the Pleasure to receive also with the Treatise this farther Testimonial of its Worth, that the Right Honourable the Lord EDGECUMBE, Mr. HOBLYN, and many other Noblemen and Gentlemen of distinguished Knowledge, who had read it in Manuscript, were desirous it should be printed for the Publick Good.

To these Testimonials of the Worth of the Piece, we have only this to add, that it is published entire, at the express Instance of the Author. We should have given the Reader only the practical Part of it, according to the Nature of this Work; but the express Condition on which we received it was, that it should be published exactly from the Manuscript, without Addition, Diminution, or Alteration. We did not think it justifiable to deprive the Publick of a Piece recommended to us under the Countenance of such great Names, on any scrupulous Strictness of that Kind; and having accepted it under this Condition, we have no Right to violate the Engagement.

The Treatise follows literally from the Hand Writing of the Author.

English Liquors best suited to English Constitutions:

OR,

An ESSAY on CYDER.

Directing how to order the Fruit: how to make, manage, and improve the Cyder to the best Advantage: how and when to Bottle it: and even how, and when, to drink it too, for Health as well as Pleasure.

By GEORGE TURNER, *A. M.*
Vicar of MILOR, in the County of CORNWAL.

PREFACE.

THE Rules laid down in the following Essay, for the Management of Cyder, have received the Approbation of an Honourable Society; as being founded on Nature, Reason, and Experience.

Although I have no Right to mention the Name of the worthy Member, who recommended this Essay to the Notice of that learned Body: yet I cannot conceal, that he stood, for many Years, at the Head of the Profession of Physick, and even to the Time of his Death. As the Rules themselves were at first drawn up at that Gentleman's Command, (for I took his Request to be such) and almost in the same Form of Words, in which they are now presented to the Publick: so that induced me to borrow so many Allusions from the Practice of Physick. What Mistakes I might be guilty of in touching upon the Medicinal Art; I had received such Marks of Friendship from him, as gave me fair Hopes of being entitled to his Correction. And I am strongly convinced, from repeated Observations in both Kinds, that the Fermentation and Cure of Cyder cannot be better illustrated, than by some particular Symptoms discernible in Human Bodies.

But its being manifestly calculated for the Benefit of my Native Kingdom, is that which hath rendered this little Treatise on Cyder acceptable to some others of my judicious Friends, as well as to the Gentleman above: for as their Hearts are entirely English: *so they would no more consent that the Health of their Countrymen should be impaired by* French *Liquors, than that their Understandings should be subjected to a* French *Religion.*

As for those who are already captivated, both in Body and Mind, and who will swallow French *Brandy in spite of their Experience, as they do* French *Principles in Defiance of their Reason, I do not pretend to reclaim them: their Constitution, in each Capacity, is broken, and they are past a Cure. The Sight of Multitudes dropping into their Graves, through an immoderate Use of strong Spirituous Liquors, can no more convince them of their pernicious Quality, than they can be perswaded of the monstrous Absurdity of Transubstantiation itself; which goes down smoothly with them, even against the palpable Conviction of their own Senses.*

But

But let ſuch Soakers be upon their Guard: for they can no more blame the French *Merchants for ſmuggling their Brandy, than they can find Fault with our* English *Apothecaries for vending Arſenick. It is a Branch of the Buſineſs of both: and if ſome get their Death by an indiſcreet Uſe of that whereby others procure their Livelihood, the Fault is entirely their own. If they will continue to drink Brandy in Spite of Fate, when they are aſſured that an immoderate Uſe of it is perfect Poiſon; their Bane is of their own ſeeking, and they muſt take the Blame, as well as the Harm, to themſelves. They fall an unpitied Sacrifice to their own Folly; and become the Jeſt and Deriſion of thoſe who ſilly furniſhed them with Materials for their Ruin. For as the County of* Cornwall, *by running out into a narrow Peninſula betwixt two Seas, doth not afford us any conſiderable Rivers; ſo the* French *very merrily, but ſarcaſtically, retort upon us for the frequent Cargoes of Brandy they furniſh us with: that they know not what Uſe we can make of ſuch a vaſt Profuſion of that Liquor every Year; unleſs it be to drive our Corn, and ſtamping Mills with it for Want of Water. That I might take an innocent Revenge upon them, the Deſign of the following Diſſertation is to rectify the Manners of my Countrymen, as well as to cure their Cyder. To convince my Neighbours of* Cornwall *in particular, (who lie moſt expoſed to Danger) that they ſacrifice every thing valuable, (their Health, their Wealth, and their Reputation) to the Whim of an ungovernable Appetite. That Providence* hath been vaſtly kind to us; and that we want nothing but Innocence and Temperance, to render our Lives as happy and comfortable, as they may thereby become long and durable. That the Liquors of our own Growth, and the Juice of the Apple in particular, if well managed, would ſuperſede the Uſe of foreign † Wines, and prove more conducive to Health than any of them.*

If this Eſſay hath its deſired Effect but upon the two Weſtern Counties of Cornwall *and* Devon, *I ſhall be content, for their Sake, to draw the Diſpleaſure of the whole Kingdom of* France *upon me; eſpecially at this favourable Conjuncture, when the whole Navy of* England *ſtands ready to guard and defend the Rights of* Great-Britain *both at Home and Abroad.*

Milar, January 29. 1756.

* Rejoice, O Britain, ſever'd from the World
By Nature's wiſe Indulgence, Indigent
Of nothing from without: In one Supreme
Entirely bleſt; long may he reign!

† —— Choice Nectar, on which always wait
Laughter, and Health, and Care-beguiling Wit,
And Friendſhip, chief Delight of humane Life!
What ſhou'd we wiſh for more; or why in Queſt
Of foreign Vintage, inſincere, and mixt,
Traverſe the extremeſt World, when native Land
Imparts from bounteous Womb annual Recruits
Of Wine delectable; that far ſurmounts
Gallick or Latian Grapes. And ſhall we doubt
T' improve our vegetable Wealth? which will ſupply
What frugal Nature aſks.——

Mr. Philips's Poem on Cyder.

1. IN the Improvement of Cyder the firſt Rule to be obſerved is, that all the Apples be permitted to drop from the Tree; that they may have the full Benefit of the Stock on which they grew, and of the Sun their Foſter-Father: for by ſtriking down the Fruit before it is ripe, the Buds are ſtruck off with it, the Tree is injured, and the Cyder that is made is tart and harſh, for Want of Time to meliorate the Juice.

2. Let your Apples (eſpecially in windy and tempeſtuous Weather) be gathered up once or twice a Week, and thrown together in ſome ſecure Place without Doors; for hoarding the Fruit in a Houſe is apt to give the Juice a muſty Taſte, for Want of a free and open Air. It alſo prevents the Cyder from quick refining, by rendering the Juice flat, dead, heavy and unapt for Fermentation.

3. Let your Apple-Heap be made on ſlanting and open Ground towards the South, that the falling Rains may fleet from it, and that your Fruit may be expoſed to the Eye of the Sun.

4. To erect a ſlight Covering of Reed over the Apple-Heap, ſupported by four tall Sticks, will be very proper; the fore and higher Part of the Covering fronting the South. By the Shed ſo contrived and ſituated, your Fruit may at once have the Refreſhment of the Air, be defended from Rain, and be alſo viſited by the Sun. But let the Bottom of the Apple-Heap be covered, or paved with broad Stones, and edged round with the like Sort, to keep the Fruit clean and cloſe together.

5. Let your Apples lie in the Heap a longer or ſhorter Time, according to the Nature of them. Mediates, for Inſtance, being of a hard Kind, and their Juice auſtere, do require a Month in the Heap, or more: whereas White-Sours, being of a ſofter and more early Sort, a Fortnight, or leſs, for them may be ſufficient. But the Time for each muſt be proportioned to the Ripeneſs of the Fruit, and to the various Diſpoſitions of the Air and Weather. For, according to the Quality of the Fruit, and the Temperament of the Air, the Apples run ſooner or later to Decay.

6. When your Apples are pounded, let the Muck lie a Day before it is ſqueezed. It will improve the Colour of your Cyder, and render it of a deeper Complexion.

7. If you make a Tun of Cyder at one Time, and have a Veſſel large enough to contain it all, it is a good Way to keep it together: that it may all become fine at the ſame Time, and be fit for racking.

8. When your Cyder is fine, (which it ſometimes happens to be within a Day or two, eſpecially upon a dry, * Northern, or Eaſtern Wind) then, by a Cock placed within half a Foot of the Bottom of the Veſſel, always allowing Room for the Dregs to ſettle in; it muſt be racked off into Hogſheads.

* *The hoary Froſts and Northern Blaſts, take Care,*
Thy muddy Cyder to refine, and drive
Precipitant the baſer, ropy Lees. Philips.

But

But although Cyder be rack'd never ſo fine at firſt, it will ferment again and become foul, eſpecially in rainy and tempeſtuous Weather, and upon ſouthern and weſtern Winds; (juſt as the Humours in a Man's Body are ſet on float, and put in Motion when the Winds are in the ſame Poſition; and therefore Laxative Potions are wont to be adminiſtered at ſuch critical Conjunctures) and then your Cyder may require ſeveral Rackings before you give over your Care about it: for all wet Seaſons are injurious to new Cyder, by cauſing a conſtant Fermentation for a Month or ſix Weeks, and longer too, if the rough Winds and foul Weather do ſo long continue. You muſt therefore be very obſervant of them, and watchful againſt them, by frequent racking, whether your Cyder be fine or not; in order to prevent its over Fermentation, and to keep it quiet.

9. Let this be a ſtanding Rule for your firſt racking: namely, to ſet about it when the thick, red Head, or Cruſt, which covered the Cyder, (like a Mantle upon a Patient under a Courſe of Phyſick) that ſo by its kindly Warmth a Fermentation may be promoted, begins to ſeparate, and white Bubbles do appear. For although your Cyder be foul at that very Juncture, it is yet very proper to rack it: otherwiſe your Cyder (like a Man waſted by an incorrigible Diarrhœa, or a violent Super-purgation) may become incurable: for it will then (eſpecially in wet Weather) inſtead of a gentle Fermentation, be put upon the Fret, and (in the South-Ham Phraſe) ſing; the wild Notes whereof may be heard at a conſiderable Diſtance) till it becomes * pale, thin and languid; and (like the Swan) hath ſung itſelf to Death.

* *Cyder of pallid Hue declares the ſame*
Devoid of Spirit: wretched he that quaffs
Such Wheyiſh Liquors. Oft with Cholick Pains,
With pungent Cholick Pangs, diſtreſs'd he'll roar.
And toſs, and turn, and curſe th' unwholeſome
Draught.
Philips.

A critical Racking, therefore, is like a critical Bleeding in a Fever; or a well-timed Cathartick, Emetick, or Clyſter in a violent Fit of the Cholick; and both the Liquor and the Patient are preſerved by Evacuations adapted to their reſpective Diſorders.

10. To prevent Waſte in racking, and, at the ſame Time, to diſpoſe Cyder for becoming fine the ſooner, Recourſe muſt be had to Percolation.

Get Flannel enough for five or ſix Bags, each containing five or ſix Quarts. Let thoſe Bags be made of a conical Figure, like a Sugar Loaf, or what the Gentlemen of the Faculty do affect to call by their Maſter's Name, the Sleeve of Hippocrates: (as if the Prince and Father of Phyſicians had carried ſome of his Art in his very Cloathing, and ſo his Diſciples pinned their Faith upon his Sleeve in a literal Senſe.) Let the ſmall Ends of theſe Bags hang downwards, that the Cyder, by its impending Weight, may the ſooner be impreſſed through them. Let the upper and open Parts be edged or bound round with Inkle; that they may the better ſupport the Weight of the Liquor.

11. When your Bags are thus prepared, get a ſtrong Hoop, and having faſtened two Sticks acroſs in it, tie up your Bags to them. The Center, where the two Sticks meet, having a Rope fixed to it, and the Bags being made to hang perpendicular over a large Veſſel, pour that Cyder into them, which remains at the Bottom of each Hogſhead after racking; and which is too foul to be mixed with the Reſt. By this Method Abundance of Cyder (and fit for common Uſe) may be preſerved, which muſt otherwiſe have been thrown away with the Lees.

12. An empty Hogſhead muſt be kept on purpoſe for the Reception of the percolated Cyder, into which it muſt be thrown from Time to Time, as ſoon as it is ſtrained. The Caſk muſt be cloſely bunged, as often as the Cyder is thrown into it, leſt the Liquor become flat by being too much expoſed in an open Veſſel. The percolated Cyder muſt alſo be racked, when there is a good Quantity of it together, and it is become tolerably fine.

13. To adapt your Cyder to all Palates, you may, either at your laſt Racking, or juſt before you bung and ſtop it up, * mix ſeveral Sorts together, and ſo render your Cyder rough or mellow, to what Degree you think fit.

* *There are that a compounded Fluid drain*
From diff'rent Mixtures, and the blended Streams
(Each mutually correcting each) create
A pleaſurable Medley, of what Taſte
Hardly diſtinguiſhable.
Philips.

14. By thus mixing your Cyder, you may give all that you intend for your own Table, the agreeable Taſte of the White-Sour. The Juice of this Pom-Royal being of ſuch a predominant Quality, as to communicate its Flavour, in a very diſtinguiſhing Manner, to all the Cyder with which it is in any due Degree mixed, Providence ſeems to have ordained it for this very Purpoſe.

I know, indeed, that in the Parts about Modbury and Kingsbridge, in Devon, where the White-Sour Fruit doth much abound, the People are more tormented with the Gout, than in any other Part of the County. This they attribute to the Uſe of White-Sour Cyder. But ought they not rather to impute their gouty Complaints to their Grout Ale of ſeveral Sorts, with which thoſe Parts no more abound than any other! Are not theſe Liquors too foul to have a clear Paſſage through them; and what becomes of their foul Contents? Muſt they not of courſe rack and torment the Bodies that harbour them?

But, if theſe Gentlemen are ſo in Love with their grouty Liquors, as not to perceive the Miſchiefs they ſuffer from them; (for, of all fermented Drinks, thoſe of the Grout Kind ſeem to be the worſt) if they are reſolved to acquit the guilty, let them not be ſo unfair, as to condemn the innocent. Before they appear in open Rebellion againſt this King of Cyder Fruit, and take up Arms to lop off the Heads of their White-Sour Trees, and to graff them to another Kind, (which, I am told, they are confederated to do after many Years Mutiny) it is no bad Advice to them to ſuſpend their intended Hoſti-

lities, and to try the Difference, by racking their White-Sour Cyder more, and by drinking leſs of it unmix'd than they are wont to do. If theſe tender-footed Gentlemen do really find their White-Sour Cyder potent and ſearching, even after they have well ſubdued it by racking; one Hogſhead of it (like what the Merchants call their Full Wine) will ſerve to improve two of another Sort, and to render all three more fit for their own Tables at Home, if not for the Markets Abroad. For White-Sour Cyder communicates its Virtue and Flavour to other Juices, as a merry Companion doth Life and Spirit to every Member of the Society in which he is engaged. And who would fall out with a Liquor ſo friendly and diffuſive of its Favours, as to diſtribute them thus frankly, and without Reſerve, for the common Good?

15. Various are the Practices of People in ſtopping up their Cyder; ſome doing it early, and others leaving it open till Christmas, and longer, if the Weather continues mild, or the Froſt be not ſevere.

As I have fully experienced both Ways; ſo I muſt give my Judgment in Favour of the latter. Due Regard ought, however, to be had to the Nature of the Fruit, and to the Time of pounding: for as the Cyder which is firſt made, may, at Christmas, be twice as old as the laſt pounding; ſo, coming from a more early Fruit, and therefore ſooner diſcharging its windy Effluvia, (the only Uſe and End of its being left open at all) it ought, for that very Reaſon, to be the ſooner bunged up.

16. While your Cyder continueth unſtopped, a ſlight and looſe Covering of Board, which may reach from Hoop to Hoop, ought to be put over the Bung-Hole, to prevent the Duſt, Rats, and other Annoyances, from breaking the thin Film, or unctuous Subſtance, which inveſteth the Surface of the Cyder; as a Guard intended by Nature for its Preſervation, like Oil upon a Flaſk of Florence Wine.

17. Eſpecial Care muſt be taken alſo to fill the Hogſhead to the very Top of the Bung-Hole, at the laſt racking; that if any light or flying Lees remain in the Liquor, they may be removed at the Bung: for this is frequently the Caſe of mellow Cyder: and if thoſe Lees are permitted to remain in it, the Surface of them, by being expoſed to the Air will become ſour. That Tartneſs will by Degrees render all the Cyder (whether it be in a Hogſhead, or in a larger Veſſel) of the ſame Complexion. Yea, the Taint may be perceived to deſcend gradually: for while the Cyder is ſour at the Top, it is ſound a few inches below it; till (like the Palſy, which takes its Riſe from the Capitol, or Brain, the Seat of the nervous Stock) it deſcends from Head to Foot, from Top to Bottom.

18. This is the grand Article in which People are wont to be deceived, and by which they are rendered out of Love with racking of Cyder, how much ſoever they are pleaſed with it, when it happens to anſwer their Wiſhes: for when their Cyder turns ſour, they are ſo weak as to imagine that racking takes away the Spirit of it, and that it muſt then become ſour of Courſe, for Want of a Body to ſupport it, as they are wont to ſpeak: whereas, in truth, it grows ſour for Want of Skill how to ſecure it after the laſt racking; by removing the light Lees which ſwim on the Top of the Liquor, before they acquire any the leaſt Degree of Acidity from the impending Air, to which the Cyder is expoſed. And if the Hogſhead is not full, or the Bung-Hole is not large enough to admit the doing of this by a Spoon, the Cyder muſt be racked again, though it be as clear as Rock-Water, or as fine as Amber: And Racking indeed is the ſureſt Way; for ſome of the Lees may eſcape the Spoon, and therefore there is no certain Dependance upon it.

19. And under the Article of Racking I muſt moreover obſerve, that the Perſon employed in racking your Cyder, muſt be particularly careful to waſh and dry his ſtraining Bags, racking Tubs and Buckets, leſt they caſt a ſour Look upon him at the Time of his next Racking. He muſt be as neat in his Cellar, as a Maid in her Dairy. No more Marks of a Sloven muſt appear in the Veſſels of the one, than of a Slut in the Utenſils of the other. For Want of this Precaution, as the Dairy abounds with a worſe than Cornish Sour-Milk; ſo the Cellar is ſtock'd with a deſpicable Sort of Vinegar.

20. The Seaſon for * bottling of Cyder for the ſecond Year's Uſe, (as that of the White-Sour, Mediate, Redſtreak, Fox-Whelp, and others of the ſtrongeſt Kinds) is at the End of August, or in the Beginning of September; that the remaining Heat of the Seaſon may give it juſt Briſkneſs enough to preſerve it the following Winter.

* *Cyder in Bottles frail improves and ſmoaks*
Tranſparent, ſparkling in each Drop:
Delight of curious Palates, by fair Virgins crav'd;
Fallacious Drink! ye fair Maids beware,
Nor truſt its Smoothneſs: the third circling Glaſs
Suffices Virtue. But may perfidious Jilts
(That ſlily ſpeak one Thing, another think,
Hateful as Hell) pleas'd with the Reliſh weak,
Drink on unwarn'd; till by inchanting Cups
Infatuate, they their wily Thoughts diſcloſe,
And through Intemp'rance grow awhile ſincere.
Philips.

Cyder thus ordered will be a prudent Reſerve againſt a Year of * Dearth, and ſtand good for ſeveral Years: longer, perhaps, than the Owner's Curioſity can prevail over his Appetite to keep it.

* —— *Elſe if the following Years*
Exhibit no Supplies, alas! thou muſt
With taſteleſs Water waſh thy droughty Throat.
Philips.

21. But Regard muſt be alſo had herein to the Difference of Climates. My warm Situation (for Inſtance) in the Southern Part of the County of Cornwall, near Falmouth, doth oblige me to defer bottling of Cyder till the End of October, or the Beginning of November; and even then to let the Bottles remain uncork'd for ſeveral Days: otherwiſe (although I do not bottle my Cyder till it be two Years old) my mellow Cyder would burſt moſt of the Bottles; and thus (like a Chymiſt who hath laboured ſeveral Years in Search of the Philoſopher's

Stone, and put all his Materials into a weak Crucible, as the laſt and finiſhing Proceſs of his Skill) I ſhould be undone by the cracking of my brittle Ware, and ruined by my own Art.

22. My coſtly Experience this Way hath taught me alſo not to fill the Bottles higher than the Bottom of the Neck, even with rough Cyder, and lower ſtill with the mellow Sort. Hereby Room is left for the ſubtil and volatile Particles to play, and expand themſelves in the empty Space, without breaking the Bottles.

As for the Experiment of a certain judicious Naturaliſt of the preſent Age, in putting a ſmall Piece of round Cork into each Bottle, for Prevention of Miſchief, I never tried it. For if the Cork happens to be muſty, or the Parts of it to be ſeparated in the Bottle, it will either prove an Injury to the Liquor, or be an Eye-Sore in it. But it calls to my Mind a beautiful Compariſon of a late celebrated Writer; namely, that a great and able Statefman out of Buſineſs, is like a huge Whale, which will overſet or daſh in Pieces a large Ship, if he hath not a light, empty Caſk to play with.

23. That your Stock of bottled Cyder may be kept from Leakage, the Corks muſt be tied down with ſtrong Packthread.

The Bottles ought alſo to be laid upon their Sides, that the Air may not find its Way by the Cork, ſo as to hurt the Liquor. The ſame Caution is needful in all other Liquors, except diſtilled Spirits, and a few Sorts of the moſt potent White-Wines. But when the Bottles are placed on their Sides, Care muſt be taken to decant the Liquor with the ſame depending Side downward on which the Bottles lay in the Cellar, that ſo the Sediment may be left behind.

24. And thus I have finiſhed that Part of my Eſſay which relates to the ordering of the Fruit; to the making, managing and improving of the Cyder to the beſt Advantage; and to the Rules proper to be obſerved in bottling of it, and in decanting of it, ſo that it may be preſented to your Friends at the Table in the moſt elegant Manner.

To lay down Rules to People, how and when to drink their Cyder for Health, as well as Pleaſure, may be deemed a needleſs Undertaking; becauſe they will tell me, that every one is the beſt Judge of his own Conſtitution.

But as the Deſign of this Eſſay is to rectify the Manners of my Countrymen, as well as to cure their Cyder; ſo I muſt here obſerve, that although Cyder, when well cured, be both a healthful and pleaſant Liquor, and is therefore well adapted to an English Conſtitution; yet it is not to be drank at all Times, and by every Perſon that can ſwallow.

There are two Sorts of People to whom I ought in this Place to addreſs myſelf; I mean thoſe who will not drink Cyder, and thoſe who cannot forbear turning Sots upon it.

I am very ſenſible, that many of thoſe of the better Rank, who have been accuſtomed to the Juice of the Grape, have their Judgments ſo perverted, and their Palates ſo vitiated, that they cannot condeſcend to the Uſe of this common plebeian Liquor, becauſe it is English.

And it may well be pleaded indeed in Excuſe of their Prejudice, that good Cyder being the Production of but few Counties in the Kingdom, even thoſe which do moſt abound with it, have it ſo often * adulterated with Preparations of Treacle, boiled Sugar, Brimſtone, Iſing-glaſs, Cochineal, boiled Cyder, and a Number of other Ingredients which I could mention; that, inſtead of being an innocent Liquor, (as it is in itſelf) it becomes a very offenſive one. For while ſuch over-buſy Practitioners do only ſtudy how to pleaſe the Eye, and to cheat the Palate, the Stomach (which ought to be chiefly regarded) is entirely neglected. Whereas, by attending to the plain Dictates of Nature, and narrowly watching her Operations, they might keep their pernicious Train of Ingredients and deſtructive Artillery for other Purpoſes; and render their Cyder more agreeable to the Sight, more delicious to the Taſte, and much more wholeſome to the Stomach without them.

* *This I warn thee, and ſhall always warn:*
No Heterogeneous Mixture uſe; as ſome
With wat'ry Turnips have debas'd their Wines,
Too frugal. Nor let the crude Humours dance
In heated Braſs, ſteaming with fire intenſe,
Altho' Cornubia *much commends the Uſe*
Of ſtrength'ning Vulcan. *With their native Strength*
Thy Wines ſufficient other Aids refuſe:
And when th' allotted Time is run compleat,
Are more commended than the labour'd Juice.

Philips.

On the Score of the many Tricks practiſed upon Cyder, it was that I drew up theſe Memoirs ſome Years ago, at the Inſtance of that worthy Member of the Royal Society, of whom I have given ſome Intimation in the Preface. That Gentleman had ſtudied Nature very narrowly; and as he reckoned Cyder the moſt healthy Liquor of any, and was determined to confine himſelf to the Uſe of it, and to have it managed under his own Eye, that he might preſerve it genuine; ſo he might well confide in my Sincerity, at leaſt, as to the Rules of doing it. Of theſe I gave him a Specimen in a perſonal Conference at his own Houſe; and was really as anxious for the Preſervation of his Health, as he had before ſhewn himſelf truly judicious in preſcribing Means for the * reſtoring of mine.

* ——— *What Returns*
Of Thanks were due to his Beneficence
Freely vouchſaf'd, when to the Gates of Death
I tended prone? If his indulgent Care
Had not prevented, with unbody'd Shades
I now had wander'd, and theſe empty Thoughts
Of Cyder periſh'd. But, up-rais'd by him,
Each Day and Night my Duty I repay'd
In grateful Taſk his Liquor to amend,
And render pure; as he had done my Blood.
The honour'd Name of M——— *ſhall ſtill employ*
My Thoughts, and dwell for ever on my Tongue.

I might, from this Paſſage, take Occaſion to enlarge upon the Virtues of Cyder, as a good Diuretick, Pectoral, and even a Cooler of the Blood too, as well as a Diluter of it, when taken in a moderate Way. But this is the Phyſician's Province, not mine. I only undertake the Cure of the

the Fermentation of Cyder, not that of the Blood and Humours.

But as Cyder is allowed by the Gentlemen of the Faculty, to be a good Antiſcorbutick alſo; and hath been known to continue ſound through an East-India Voyage: yea, to become better by twice croſſing the Seas to and from that remote Part of the World; and to * imitate the Taſte of ſeveral Sorts of Wine: ſo I have often wondered that the Board of Admiralty have not, till of late, directed the Uſe of it to his Majeſty's † Navy; and that Maritime Perſons in the Merchants Service too, when bound upon long Voyages, ſhould ſet out from their reſpective Ports without a competent Stock of it.

* *Some Cyders have, by Art or Age, unlearn'd*
Their genuine Reliſh, and of ſundry Wines
Aſſum'd the Flavour. One Sort counterfeits
The Spaniſh Product: this to Gauls hath ſeem'd
The ſparkling Nectar of Champaigne: with that
A German oft hath ſwell'd his Throat, and ſworn,
(Deluded) that imperial Rhine beſtow'd
The generous Rummer. Whilſt the Owner pleas'd
Laughs inly at his Gueſts thus entertain'd
With Foreign Vintage from his Cyder Caſk.
PHILIPS.

† *Where'er the Britons navigate their Ships,*
Diffuſive to the utmoſt Bounds of this
Wide Univerſe, the Britiſh Cyder borne,
Will pleaſe all Taſtes, and triumph o'er the Vine.
PHILIPS.

Much might be advanc'd in Commendation of Cyder, and in Point of Health, to gain it the Preference to Foreign Wines, how neatly ſoever they are ſaid to be imported; yea, though they are found to anſwer too that Character of the inſpired Writer; namely, to make glad the Heart of Man. For all Wines abounding with tartarous Salts; and the Fermentation of them being quieted, while their Spirit is raiſed by a Mixture of Brandy in their Cure, the frequent Bibbers * of them do contract the Seeds of the Gout, Gravel, Scurvy, and other Maladies, to which this our British Wine doth not render us obnoxious.

* *I need not tell what dreadful Ills attend*
Immoderate Uſe of Wine: nor all the Kinds
Of Maladies that lead to Death's grim Cave,
Wrought by Intemperance: Joint-racking Gout,
Inteſtine Stone, and pining Atrophy. PHILIPS.

I muſt not here omit the Names of two eminent Phyſicians, *viz.* Sir John Floyer, and Dr. Baynard: the former of whom found much Benefit in a ſevere Aſthma; and the latter owed his Life twice, when in a moſt deplorable and confirmed Phthiſis, or Conſumption, to the Uſe of Apples and Pomaceous Juices.

And if this Fruit was not the Growth of England, but the Production of the Indies, it would, probably, upon the Strength of ſuch Authority, have been celebrated more than it is in our Diſpenſatories, by Quincy, Allen, James, and the Writers in that Way: be brought over to us either dried or in Conſerve: have a top Place in Phyſical Preſcriptions: and be cloſeted by the Apothecaries among their other rare and coſtly Drugs.

For that Apples are great Preſervatives, as well as good Reſtoratives of Health, let the ſeveral Inſtances quoted by the ſaid Dr. Baynard ſuffice to ſhew. Among other Things in Commendation of Apples, he tells us, in his Hiſtory of cold Bathing, p. 314. of a Gentlewoman and her three Sons, who came to Holland, from ſomewhere near Pomerania, to claim an Eſtate which fell to them as next Heirs, by the Death of ſome Relation: and that the Sons, as well as the Mother, were ſo very old, that, betwixt them all they made up four Hundred and thirty-ſeven Years. For what the younger were ſhort of a Hundred, the elder were above a Hundred; which compleated the ſame Number of Years. Whether they lived a Century, or more, beyond that Term, our Author doth not ſay. But when their Way of Living, as to Eatables and Drinkables, was enquired into, it appeared that their Drink was chiefly Apple-Water, or Crab-Apples bruiſed and ſteeped in Water; and their Meat plain, ſimple, Country-Fare, with but little Fleſh.

Now as their Drink was what we in England call Beverage, that is, a Mixture of Water and Cyder: ſo the Place of their Habitation being on the Borders of Pomerania (a † Country famed in Hiſtory for Plenty of Fruit, and abounding perhaps with Apples too, from which it ſeems to derive its Name) theſe, probably, were a great Part of that plain, ſimple, Country Food by which our Author tells us they prolonged their Lives. Their Fleſh Diet was very moderate; juſt enough (we may ſuppoſe) to cook up that English Diſh of a Squab Pie upon Occaſion, and when, in entertaining their Friends, they indulged a little beyond the common and ordinary Way.

† *See Collier's Dictionary.*

But I ſay no more upon this tender Point, leſt I give Offence to the Profeſſors in the Medicinal Art, and ſo draw upon me the Cenſure of an arrant Quack, by aſcribing ſuch wonderful Virtues to ſuch contemptible Means.

I knew myſelf ſecure from the Diſpleaſure of my celebrated Æſculapius. For as he was no leſs famed for his diſintereſted Spirit, and Publick Humanity, than for his great Skill in Phyſick: ſo, in his various Reſearches into the Secrets of Nature, he would have been glad to have found all the Virtues of the Materia Medica contained in a ſingle Apple; that he might have had the Pleaſure of obliging the World with the valuable Secret.

And yet it is very evident, that if an effectual Remedy was found ſo near at Hand for the Cure of that ſingle lingering Diſeaſe of the Conſumption only, a great Part of the Phyſicians Buſineſs would ceaſe. Yea, the Inventor of this Sovereign Elixir Salutis, though he might be rewarded by his Prince with a Patent, muſt yet expect to be pelted by the Fraternity in general, for exploding the large Trumpery of Phyſick; as St. Paul was by the Crafts-Men, for baniſhing the Heathen Gods out of the World; and ſo bringing the Gain of their Craft or Occupation to nothing.

And now I am come to Scripture Teſtimony, it may ſuggeſt, perhaps, a Fancy to the Reader, that that Divine ought to be accounted Heterodox,

and of a different Opinion from the Church: a Sceptick, or a Free-Thinker, who dares aſcribe any Sanative Virtue to a Fruit, the prohibited Uſe whereof ſome fondly conceive to have been the Introduction of Sickneſs, Diſeaſes, and even of Death itſelf, into the World.

But ſurely the Apple ought to have the ſame fair Plea, and Indulgence, with a reputed Criminal at the Bar: I mean, not to be condemned by Hear-ſay, or Conjecture, till the Guilt is roundly and fully proved. In the mean while let the frequent, and approved Uſe of Apples after * Dinner, (even at Tables moſt abounding with other Proviſions, and as proper to help Digeſtion after a full Meal) ſerve to vouch for their Innocence at leaſt, without retaining a Counſellor to plead it in Court vivâ voce.

* ——— *ab Ovo*
Uſque ad Mala. Hor.

I muſt obſerve further, that the Hurt did not ſeem to lie in the Paradiſiacal Fruit itſelf, but in the Tranſgreſſion of the Divine Command. The Prohibition might have been annexed by God to whatever Subject he thought fit. But on what Fruit ſoever it was fixed, the Fall of Man is not to be aſcribed to any pernicious Quality in the Fruit itſelf; but to the Diſobedience of a curious, unruly Appetite; edged on by Pride, and by the ſly Inſinuations of that cunning Serpent the Devil.

Not but that it hath been conjectured by ſome very learned Men, that the Fruit of the Forbidden Tree was impregnated with ſome fermenting Juice, which (like that violent Operation too frequently perceivable in Cyder) put the Blood and Spirits of our firſt Parents into great Diſorder; and thereby diveſted them of the Power and Dominion which their Souls had before over their Bodies. That it clouded their Intellects, corrupted their Wills, and reduced every Faculty of their Minds to a ſhameful Deformity, to a miſerable Depravity. Like that Indian Juice, which is ſaid to turn even the moſt ſagacious and ſenſible Man that drinks it into an Idiot, or natural Fool.

Suppoſing therefore that the Miſchief did lie in the Fruit itſelf, I ſhould be inclined, from thoſe ill Properties of it, to conclude, that the Grape, and not my favourite Apple, was the very Fruit forbidden. For it was the Juice of the Grape which gave the firſt Occaſion to Drunkenneſs, that we read of. By which the firſt Divine Orator, or Preacher of Righteouſneſs, was befooled and cheated out of his Reaſon, and became expoſed to his own Family: a Shame and Scandal to his Children: a Spectacle not to be endured without a Covering to hide his Deformity. A Noah transform'd, for a while, into the Condition of a Brute; and wallowing in the Mire and Filth of Senſuality.

With the bewitching Juice of the ſame Sort of Fruit, but rendered ſtill more miſchievous by the Art of the Diſtiller, unknown to the Ante-Diluvians, (which reduceth groſs and large Bodies into a ſmall Compaſs; as all the Evils, Diſeaſes, and Calamities of Life were ſaid to be crowded together in the little Box of Pandora: which is a conciſe Repreſentation of the woful Effects of the Fall of Man, according to the Heathen Theology) by their Brandy I ſay, our Neighbours of France, with their Serpentine Cunning, do draw us into the Snare. For this Liquor (which is extracted from their worſt Wines, and even from Dregs) if not warily uſed, becomes of the ſame intoxicating Nature with the Lethean Waters. It obliterates, for a while, all the Traces of Reaſon. It deſtroys Men's Memories, makes them forgetful of what is paſt, and renders them unfit for preſent Service. It blunts the Edge of their Underſtanding, and enfeebles their Bodily, as well as Rational Powers.

Hence a late Phyſician of much Note in the Literary World, as he was in the Practice of his Profeſſion, hath wittily called all Sorts of Liquors, in which Brandy makes a Part of the Compoſition, "The Devil muzzled."

But notwithſtanding the Muzzle, the Cyſtis, or Bag of Poiſon, lieth concealed under the Tongue; and all the Liquors with which Brandy is wont to be mixed, cannot waſh away its Venemous Quality. The moſt that can be ſaid in Favour of ſuch compounded Liquors is, that thoſe who drink Brandy in Mixture with other Ingredients of an innocent or leſs offenſive Nature, may be ſaid to do it with ſome Caution, though with ſome Imprudence. But thoſe who drink it unmixed (Puris Naturalibus, according to the Tippler's Language) they really do it without either Fear or Wit; their Conduct is as bad as their Latin.

In the laſt War with France, when our Priſons were not large enough to contain the Priſoners, thoſe of the French who had the Liberty to walk Abroad upon their Parole, did ſometimes, in cold, froſty Weather, call for a Dram of English diſtilled Liquor at our Publick-Houſes. But when inſtead thereof, a Dram of French Brandy was brought to them, I am credibly informed, that they only ſmelt the Liquor, but refuſed to taſte it; ſaying, it was good for Engliſhmen but not for the French. So hoſpitable are they to furniſh us, in a very plentiful Manner, with what they do not think it ſafe to drink, or even to taſte, themſelves! And why ſhould not the English be equally cautious of this combuſtible Liquor, who are not ſo well acquainted as the French are, with the Way and Manner of its Preparation?

To return from this long, but not altogether uſeleſs, and impertinent Digreſſion.

The Management of Cyder is a Secret, which the Curious are too fond of keeping to themſelves. As People have their different, and peculiar Ways of doing it, according to their ſeveral Fancies; and as they are notoriouſly ambitious of excelling one another, in this Domeſtick Liquor; ſo, one would think, there was a Spice of Envy mixed with their Emulation, which hinders them from communicating their ſeveral Arts. They converſe freely enough upon various Kinds of Huſbandry; and upon the ſeveral Ways of ordering and managing their Lands, in ſuch a Manner as to reap the moſt advantageous Returns from them. But, amidſt their other Friendly Diſcourſes and Communications, they are ever reſerved and wary upon the Sub-

Subject of Cyder. Here they ſit as mute as the Gentlemen of the long Robe; who, when a Caſe of Property is ſtated to them in Company, and Queſtions are aſked about it, do rarely open their Mouths without a Fee; till a chearful Glaſs hath relaxed their Tongues from their wonted and profeſſed Taciturnity; and opened their Hearts to a generous Diſcloſure of their Thoughts.

Yea, even thoſe who have obliged the World with Rules and Methods for Improvement of Lands, by the Plantation of Orchards, and from thence have paſſed on to Cyder; even theſe, I ſay, have handled this uſeful Subject but ſlightly, and in Tranſitu, as it ſtood in their Way to ſome other Article in View.

Some of them, it muſt be confeſs'd, have been nice enough in deſcribing the ſeveral Engines for making of Cyder: but when it is made, they even leave it to the Mercy of Chance, whether it prove drinkable or not.

Others have, moreover, recommended a Separation of the good Cyder from the Lees: which, in the modern Dialect, we term Racking. But then they are ſo looſe in their Reaſons for, and Rules of doing it; that the Reader is ſtill left to gueſs when, and how, it ought to be done. Hence is is that that Bee of Arts and Sciences, Mr. Chambers, in his Univerſal Dictionary, hath ſaid ſo little upon this Article. Although (like the painful Creature above) he hath ranſacked Woods and Foreſts, Hills and Mountains, Sea and Land, and the Univerſe itſelf, for Honey to ſtock his Hive with: yet (for want of other Flowers, I ſuppoſe, to make a Collection from) he is obliged to take up with a ſingle Quotation from Mr. Worlidge; and the Reader is ſtill to ſeek for that Information which he expected.

Nor indeed can the Cyderiſt be, any other Way, perfect and compleat in his Art, than by narrowly attending to the whole Courſe of Fermentation. He muſt as nicely watch the ſeveral Periods of it, as a careful Phyſician notes the ſeveral Periods of an intermitting Fever, in a Patient whoſe Life he is anxious to preſerve.

If any clear and diſtinct Treatiſes of Cyder have hitherto been publiſhed, they have eſcaped my Hands; and ſo fall not under the general Character above. For want of the Sight of any ſuch, I conceived there might be Room in a wide World, for this little Manual. I have been the more exact and particular in laying down the Rules, and in aſſigning the Reaſons of them, for the Supply of the imaginary Defect above. Inſomuch that I think I have rendered every thing clear, plain, and intelligible to the very meaneſt Capacity. For I have penn'd it for the Service of the Farmer *, as well as of the Gentleman *; for the Uſe of the poor Rack-Holder, as well as for his rich and wealthy Lord. I have therefore endeavoured to put the Rules in ſuch a Dreſs, and to expreſs them in ſuch Language, as to adapt them to the Taſte and Comprehenſion of every Reader.

* ——— *Lo thoughtful of your Gain,*
Not of my own, I all the live-long Day
Conſumed in Meditation deep, recluſe
From Human Converſe: nor, at ſhut of Eve
Enjoy'd Repoſe: but oft at Midnight Lamp
Ply'd my Brain. Racking Studies, if by Chance
You I might counſel right. And oft this Care
Diſturb'd me ſlumb'ring. Will you then repine
To labour for yourſelves? And rather chuſe
To lie ſupinely, hoping Heav'n will bleſs
Your Cyder thus neglected; or give Bread
Unearn'd by Toil?
Philips.

But as Rules of all Kinds are jejune and dry; and a Sort of dead Letters, if there be not ſomewhat to quicken them: ſo I have intermixed Similitudes with them, and added a few Digreſſions to them, to divert the Reader, and to make them go down the better. Juſt as Apothecaries are wont to pleaſe and humour their Patients with gilded Pills. The Aſa-Fœtida thus concealed, is taken by the niceſt Ladies without Reluctance; though the Leaf-Gold is confeſſedly of no Manner of Uſe in Phyſick.

Some imperfect Draughts of this Eſſay have crept Abroad, and been well received, I hear, in many diſtant Parts of this Kingdom. For Strangers are always welcome, when they give the Maſters of the Houſe no Trouble; nor put them to any Expence in their Entertainment. But they are more eſpecially ſo, when, beſides the News they carry with them from their own Country, they offer to ſerve their Entertainers gratis; and without Meat, Drink, or Wages, to become Caterers for their Profit, as well as Pleaſure.

If any of thoſe few, whom I have obliged with the Rules for Improvement of their Cyder, do look upon Obligations of the ſame Kind to others, as an Infringement upon their Property, by thus breaking down the Encloſure, and turning the little Spot, as it were, into a Common: my Anſwer is, that I am very much miſtaken, if I have ever yielded up the Poſſeſſion into envious, mercenary, or ſelfiſh Hands. My Deſign in imparting it to a few, was, that it might be communicated to many, and ſo ſerve, in ſome Meaſure, the Ends of the Preſs; to which I had no Thoughts of committing it, had it not been ſuggeſted by a particular Friend, as a uſeful Article to be inſerted in the Book of Huſbandry. And I ſhould be glad to hear, from my Readers in general, as I have already from thoſe who have had the Manuſcript Copies imparted to them, that they have as good Cyder of their own Growth, by a cloſe Obſervance of theſe Rules, nay much better than they can meet with at the publick Markets from the South-Hams, or Hereford.

I am well aware that this Tract will appear in the Book of Huſbandry, like a Stranger in a Publick Theater. Some may caſt a favourable Eye upon it; but others will look aſquint. There is one Claſs of Men in particular who will ſcarce forgive me, and from them I expect no Thanks. Theſe are the Cyder Merchants: or ſuch as make it their Trade to buy Cyder from the Pound, to manage and to ſell it at London, and other populous Places.

But when theſe Dealers conſider, that although this Eſſay may prove of ſome Diſ-ſervice to their

particular Employments, or Way of Buſineſs: (as it will teach every Farmer how to cure his own Cyder at Home, without being put to the needleſs Expence of ſending it to the publick Cellars for that Purpoſe) yet if it will turn to the Publick Benefit, by improving a conſiderable Branch of the National Revenue; they will, ſurely, ſhake Hands with me. At the worſt they cannot be ſo ſevere upon me, as not to pardon an Attempt which ſo directly aims at the Publick Good. Yea, perhaps, they may herein eſpy ſomething (how unwilling ſoever they may be to acknowledge it) which had before eſcaped their Obſervation: or for which they could not render a proper and ſubſtantial Reaſon.

But whether they will acknowledge this or not, it is certainly the Intereſt of every Nation, to carry their Home Manufactures to the higheſt Perfection they are capable of; that ſo they may live as independent of their Neighbours as poſſible; and alſo export the ſuperfluous Products of their own Country to Foreign Markets.

But alas! while inſtead of improving our Cyder, ſo as to render it fit for our own Tables, and ſaleable Abroad, our Heads are only projecting how to get Foreign Liquors to mix with it, and ſo to ſpoil, inſtead of improving it, in that coſtly Way; we are burthened and overſtocked with both, by a clandeſtine and deſtructive Trade with France, we part with our Money, and (which is ſtill more valuable on the Score of the many Hands employed in the Woollen Manufacture) ſometimes with our Wool too: and ſo keep our Enemies warm againſt External Colds, for ſeveral Years; while in Exchange, they only warm us within for a few Minutes. We pleaſe ourſelves with the Name of Sampson (that is to ſay, Brandy and Cyder) but, like ſilly Prodigals, we wantonly part with the Golden Locks, in which our Strength doth lie.

I know it is a difficult Thing to ſtem the Tide of general Practice, and to perſuade Men to any thing againſt their Inclination. It is like preſſing upon them thoſe hard Leſſons in Religion of plucking out a right Eye, and cutting off a right Hand. It is a tearing up by the Root the darling Affections of their Heart.

To put an old Brandy Drinker, for Inſtance, under the Mortification of a total Abſtinence, is like putting a Knife to his Throat, for he cannot live without it. He hath ſo over-heated his Conſtitution with this combuſtible Liquor, that Cyder, alas! is become too cold for him. He fancies that he ſhould be dead ſoon, if he hath not ſomething to warm and comfort his Heart; eſpecially in cold and froſty Weather; upon a Journey; after hard Labour; and to keep him warm while he is ſo; at leaſt to prevent his cooling too faſt, and to keep his Blood from being chill'd. Yea, Brandy is become an Antidote for all Intemperance, both in eating and drinking; juſt as one Sort of Poiſon is preſcribed by the Phyſician for expelling another. Thus a Dram is exhibited by the Maſter of the Feaſt after a plentiful Dinner, or the Uſe of groſs Food. It is the only Latin that we hear at Table for Pig and Gooſe in particular. It pinneth up the Baſket, as we ſay, and becomes the laſt Glaſs at parting, after a Deluge of other Liquors. Yea, Tea, and Punch itſelf, are fancied not to ſit quite eaſy upon the Stomach, without a clean Dram for a Rider. Thus Brandy hath the good Luck to obtain the Fame of a Sovereign Cordial: of a Catholicon that hits every Diſorder; that is ſuited to all Conſtitutions, to all Times, to all Places, and to all Occaſions.

I have found many People in the World thus befooled to their Ruin, and have had an Account too of many more. But I am ſtill ſenſible that the Corruption is not univerſal. I ſhall therefore think my Pains well beſtowed, if they afford ſufficient Caution to the uncorrupted Part of the preſent Generation, from falling into this fatal Snare, from whence their Friends or their Fore-Fathers did confeſs it even impoſſible for them to recover.

But I muſt not leave ſuch poor miſerable Creatures as I find them. If they are not already ſo blinded and beſotted by this intoxicating Liquor, as to be entirely loſt to their Reaſon, I muſt beg them to conſider that, inſtead of ſupporting their Spirits by Brandy, every Dram is a Sort of freſh Wound, or Stab inflicted upon themſelves; and that therefore every ſuch repeated Act of Suicide, or Self-Murder, doth require alſo a particular Act of Repentance to waſh away the Guilt thereof.

Nor muſt I look upon them as incurable, and ſo forſake them; as the Phyſician uncourteouſly turns his Back to his Patient, when he finds the cold Sweat upon him. For though the Diſeaſe of Brandy-drinking may be reckoned of the moſt inflammatory Kind, and highly malignant: yet while there is Life there is Hope; and a Cure may be wrought without running the Riſque of a dangerous Experiment, or a deſperate Remedy.

As thoſe who have enervated and blunted their Reaſon, by this ſtupifying Liquor, are rather to be taken by Guile and Artifice, than to be wrought upon by rational Inducements: ſo I would recommend to them the pretty Device of a Dutch Doctor, upon the like Occaſion.

Finding his Patient too far gone in the Phrenſy of drinking Brandy, to be cured of the ill Effects of it by Phyſick: that his Appetite to Food failed him; that his Pulſe was quick and intermitting; that he had a Cough upon him; and that he had all the Symptoms of Night Sweats approaching, and ſo of his entering upon the laſt Stage of a Conſumption; the Doctor thought it expedient to remove the Cauſe of the Diſeaſe, inſtead of doſing him with Phyſick; and ſo weaned him gradually from that fatal Practice by this artful Stratagem. He did not debar him from his favourite Cordial at once, but indulged him the Uſe of it upon this eaſy Condition: namely, that he ſhould ſtrictly obſerve to put a large Duck Shot into his uſual Dram Glaſs, every Time before he took his Doſe. For Lead, ſaid the Doctor to him, is of a cooling, healing, balſamick Nature; and therefore good to refreſh and ſtrengthen his weak and tender Lungs. By the frequent Addition of Shot, and their Continuance in the Glaſs with ſome of the Liquor, under Pretence of Infuſion, for an Hour, (according to the Doctor's Direction) the Doſe was reduced at laſt to the Quantity of a

Tea-

Tea-ſpoonful; and by that Means he both reclaimed and recovered his Patient. For he grew well in Proportion to the gradual Diminution of his Doſe. A very honeſt and cheap Preſcription for the Cure of this wretched Malady of Dram-drinking. Not as other Sorts of Madneſs are cured, by Evacuations of all Kinds; by the tedious and painful Experiments of Cupping, Bleeding, Bliſtering, Vomiting, and Purging; and ſometimes by the Correction of Chains too: but by the imperceptible, and daily Abatement of the wonted Superfluities of the Glaſs; and by a ſlight Curb, and eaſy Reſtraint upon an inſatiable Appetite of Liquor. And thus the Vices of the Mind, as well as the Diſeaſes of the Body, are beſt cured by Practices oppoſite to thoſe that begot them.

The Uſefulneſs of this Subject of Cyder muſt apologize for my having ſtepped out of my Profeſſion to treat of. And if an Irish Prelate hath condeſcended, for the Good of his Country, to enter into a Minute and Philoſophical Examination of the Virtues of Tar-Water; and to extract a Panacea from the inſpiſſated Juice of an Exotick Tree: why ſhould a poor English Vicar be deprived of the Pleaſure, or be debarred the Liberty of caſting his Mite into the Publick Treaſury, by improving a Liquor of our own Growth, and of which we have ſuch a vaſt Conſumption among us?

The Rules laid down in the Beginning of this Eſſay I have fully experienced, in a Courſe of many Years Reſidence in the South-Hams. When others have found as good Succeſs in the Obſervance of them as I have met with, by rendering their Cyder from Fifteen Shillings a Hogſhead, (the prime Coſt at the Pound) worth Five Guineas; yea, as valuable as an Hogſhead of Wine (each of which I have actually refuſed for a Hogſhead of Cornish Cyder) they will, at leaſt think themſelves ſo much obliged to me, as to ſay; that neither their Labour, nor my own, hath been ill-beſtowed. I have received the thankful Acknowledgments of many, who have frankly declared, that their Cyder, which before uſed to be thin, poor, and hungry, hath, by their following theſe Directions, proved ſo rich, full, and good, that their Friends (eſpeciall thoſe who have been bred in the Maritime Way) have, during the Summer Seaſon, called for it at Table, and preferred it to the beſt of Port-Wine: and, in plain Terms, they reckon it a valuable Article in Houſe-keeping.

But I muſt be ſo ſincere with my Reader, as to acquaint him, that thoſe who have followed my Rules but in Part, and who have been diverted by a Multiplicity of Buſineſs, Company, Recreation, or Pleaſure, from giving a due Attendance to their Cyder, they have found themſelves much deceived in their Expectations, when it was too late to amend their Fault. Like heedleſs Practitioners in Phyſick, who diſmiſs their Patients with a ſingle Phlebotomy, and Box of Pills, and take no farther Care about them, till their whole Maſs of Blood is corrupted, and their Conſtitutions are quite emaciated. But although, in chuſing an Aſs for their next Doctor, the Patients may happen to be reſtored, by the Balſamick Milk of that, otherwiſe contemptible, Creature, to a tolerable Share of Health: yet the Cyder is gone (as we ſay) paſt Recovery, and beyond the Art of Man to cure.

But as this Diſſertation is intended for the Benefit of my Country in general, and more eſpecially for the Uſe and Service of thoſe Parts of the Kingdom which do moſt abound with Cyder: ſo it would ſorely grieve me to hear that an ill Uſe is made of it. It would much trouble me, I ſay, if ſome leading Member of Parliament, who is not a Repreſentative for a Borough in Devon, Hereford, or Cornwal, ſhould, in the Vacancy of State-Affairs, have the Curioſity as well as Leiſure, to caſt his ſagacious Eye upon it; and ſo, in Envy to the ſingular Happineſs of the few Counties famed for Cyder, ſhould be tempted to move for an additional Duty upon it, in ſome future Seſſion. For, if repeated Struggles have been made in the Houſe of Commons, about taxing the Juice of the Apple as a Potable only: to what Height may the Debates riſe, when a ſecond Sir R—rt ſhall appear there; and, with all the Flow, Grace, Dignity, and Force of Senatorial Eloquence, ſhall move and ſuggeſt, that Apples do not only ſupply us with Meat and Drink, but that they ſerve us alſo for Phyſick as well as Food.

For that the Apple affords a healthful Nouriſhment, is evident not only from the Foreign Examples of the Pomeranians, cited above out of Dr. Baynard; but alſo from Inſtances near at Hand, of the Inhabitants of the South-Hams (where the Seeds of this imperfect Eſſay did at firſt appear) and of the County of Hereford (which was the Scene of Mr. Philips's Poem on the ſame Subject.) For as Apples, cooked up in various Forms, are a conſiderable Part of their Food from the End of July to the Beginning of December: ſo Cyder is their principal and conſtant Liquor throughout the Year. And yet a more healthy Body of Men, or more * chearful in their Way, and truly merry in their Compotations, cannot be found throughout the Kingdom.

* *The Farmer's Friends, at thirſty Hour of Duſk*
Come uninvited: he, with bounteous Hand,
Imparts his ſmoaking Vintage, ſweet Reward
Of his own Induſtry. The Nut-brown Jugg
Circles inceſſant, whilſt the humble Cell
With quiv'ring Laughs, and rural Jeſts reſounds.
Eaſe, and Content, and undiſſembled Love
Shine in each Face: the Thoughts of Labour paſt
Encreaſe their Joy. ———
Gladſome they quaff, yet not exceed the Bounds
Of healthful Temperance, nor ſteal from Night,
Seaſon of Reſt: but well bedew'd repair
Each to his Houſe with unſupplanted Feet.
E're Heaven's emblazon'd by the Roſie Morn,
Domeſtick Cares awake them. Briſk they riſe
Refreſh'd, and lively with the Joys that flow
From amicable Talk, and moderate Cups
Thus ſweetly interchang'd. No noiſy Brawls
Ariſe from ſocial Glaſs. May Britons *all,*
Remote from brazen Sound of War, enjoy
Nectareous Cyder, and with ſeemly Draughts,
Enkindle Mirth, and hoſpitable Love.

But

——————— *But let them thank*
That Providence which annually ſupplies
Their Cellars, and with her rare liquid Gifts
Exhilerates their languid Minds, within
The Golden Mean confined: beyond there's nought
Of Health or Pleaſure found. But when thy Heart
Dilates with fervent Joys, and eager Soul
Prompts to purſue the ſparkling Glaſs, be ſure
'Tis Time to ſhun it. If thou wilt prolong
Dire Compotation, forthwith Reaſon yields
Her Empire to Confuſion, and Miſ-Rule,
And vain Debates. Then twenty Tongues at once
Conſpire in ſenſeleſs Jargon: nought is heard
But Din, and various Clamour, and mad Rant:
Diſtruſt and Jealouſy to theſe ſucceed,
And Anger kindling Taunt; the certain Bane
Of well-knit Friendſhip. Now horrid Frays
Commence: the Bumper-Glaſſes now are hurl'd
With dire Intent: Bottles with Bottles claſh
In rude Encounter: round their Temples fly
The ſharp-edg'd Fragments: down their batter'd Cheeks
Mix'd Gore and Cyder flow. Ye Heav'nly Powers
From British *Iſles ſuch dire Events remove*
Far diſtant; neither let our civil Broils
Ferment from ſocial Cups! May we enjoy
Our humid Products, and with temp'rate Draught
Enkindle Mirth and hoſpitable Love!

Philips.

But it muſt alſo be noted, that when they happen to take a cheerful Cup, they commonly know their Quantum Sufficit, wind up their Bottoms, and either return to their Labour, or to their Reſt. Thus they enjoy an almoſt uninterrupted Health: feed (as we ſay) like Farmers; and avoid thoſe Exceſſes by which the intemperate Part of Mankind are led into many Inconveniences; to the Ruin of themſelves, of their Fortunes, and of their Families.

If any ſhould here obſerve, that I have overſhot my Mark, and that Cyder, Sobriety, and Temperance are very diſtant Subjects; I have this to plead: that in directing People how to make their Cyder better I ſhould have done them more Hurt than Good, unleſs a ſeaſonable Caution had been interpoſed and interwoven, if I may ſpeak in the Phraſe of a Woollen Manufacturer, with the ſeveral Threads of this Eſſay, to make the Drinkers of this Liquor to become better alſo. To render their Cyder more palatable, would be only laying a more ſubtil Snare to entrap them, unleſs I had alſo preſſed and recommended a temperate Uſe of it.

The English are, by their very Enemies, acknowledged to be a brave and a warlike People. Even the King of France (if Credit may be given to the Publick Papers) allows them to have Hearts, though he is pleaſed to deny them Heads. And it muſt be confeſs'd indeed, that English Heads are mightily injured, but not totally deſtroyed, by French Brandy. His Majeſty therefore may be ſaid to deal by us as the Philistines did by Sampson; firſt to blind us by his intoxicating Spirits, and then to jeſt upon, and make Sport with us. But when we recover from this Lethargick Fit, as Sampson's Hair grew again, and his Strength with it, the Pillars of abſolute Monarchy may poſſibly ſhake, as thoſe of the Temple of Dagon were removed by the Hands of the Giant; avenging himſelf at once upon the Philistines, for their unſeaſonable Mirth, and for the Loſs of his two Eyes.

I do not ſpeak this to exaſperate our Military Men; but to imprint in their Minds this ſeaſonable and certain Truth: that if they were as ſober as they are naturally brave, they would excel in every Station of Life. They would ſhine both in a Council of War, and in the Field of Action. Their Enemies would no more come near them in the Stratagems, than they are able to withſtand them in the Exploits of War.

That excellent Rule, he that ſtriveth for Maſtery is Temperate in all Things, is as needful to be obſerved in the Carnal, as in the Spiritual Warfare. A ſober Warrior keeps his Reaſon cool, awake, and conſiderate. He hath the free Uſe of all the Powers and Faculties both of Mind and Body. His Head is as quick to diſtinguiſh and contrive, as his Eye to eſpy, and his Hand to execute. He ſoon diſcerns the moſt weak, open, and unguarded Parts of his Enemy's Troops, or the leaſt Defects in their Fortifications: and as boldly puſheth his Way thro' their Ranks, forceth their Lines, or mounteth a Breach. By the Rules of Temperance (the Siſter of Fortitude and Prudence) thus ſteering his Courſe, as the Sun doth by the Zodiack, like that glorious Luminary he is bright in all his Faculties, indefatigable in the Charge aſſigned him, and rejoiceth as a Giant to run his Courſe. In this active, yet unwearied Manner, methought I beheld with grateful Eyes, in the laſt War, our British Hero traverſing Sea and Land; and no ſooner leaving Flanders, than appearing in the memorable Field of * Culloden, and charging the inſulting Rebels with ſuch undaunted Bravery (in Defiance of their once formidable Back-Swords) as to put them to a perpetual Flight, we hope, as well as Shame.

* ——————— *Here might you ſee*
Lairds, and their Clans on the embattled Field
Slain, or half dead, in one huge ghaſtly Heap
Promiſcuouſly amaſt: with diſmal Groans,
Ejaculations in the Pangs of Death!
Some call for Aid neglected: ſome o'erturn'd
In the fierce Shock, lie gaſping and expire,
Trampled by fiery Courſers. Horror thus,
And wild Uproar, and Deſolation reign'd
Unreſpited. The young Adventurer
With long-ſtretch'd haſty Strides forſakes his Hoſt,
Trembling, agaſt, not venturing to look back,
Poſting for France: *but leaves the envy'd Crown behind,*
His Title and Deſcent beſt prov'd by Flight:
Witneſs thou Boyne: *and witneſs* Culloden ——
May George's *Crown long flouriſh on his Head*
In ſpite of France *and* Rome! *May* Cumberland
Continue long to guard his Father's Throne!

On the contrary, if we take a View of Sottiſhneſs, we ſhall find it the Parent of thoſe twin Siſters, Folly and Cowardice. The Perſon addicted to it cannot have his Senſes nor his Intellectuals clear. His Head is filled with groſs Fumes, and his Underſtanding clouded. A Miſt continually obſcures and veils his Reaſon. The

Virtues of his Soul are lulled asleep; and he is hush'd and becalm'd into Ruin. His Bodily, as well as Rational Faculties, are brought into Bondage, and laid in Chains of Iron. He becomes weak and enervated in both: and the Soldier in this Condition, like his Drum without Braces, is unfit for the Battle.

Should I here pass over the British Sailors, they would rage and storm upon me, as not thinking them worth my Notice: though I really esteem them as a very valuable and a very useful Body of Men: and the more I know them the greater Reason I find to respect them. Among Friends Freedom of Speech is allowable, and the honest Tars cannot blame me for wishing, that they were to be reclaimed by Reflexions of this Nature. But alas! they are such a merry, thoughtless, jovial Crew, that they are only to be cured by Time and by dear-bought Experience. They are such an active, and yet such an idle Sort of Men; so averse to Fatigue and Labour, and yet so fond of running into the most busy Scenes of Life: so profuse of Money, and yet so often hazarding their Lives for it: so fam'd, in short, for the Extremes of Activity and Indolence, of the eager Thirst after, and the visible Contempt of, Gain, that they seem a perfect Riddle, and to surpass all Description.

But amidst such various Contrasts as center in their single Character, the Courage of English Sailors doth either attone for all their Failings, in the Eye of their Fellow-Subjects, or casteth a favourable Covering over them. Their Valour is not to be parallelled among the Maritime Tribe; and no more admits of Contradiction, than it will submit to Opposition. I can compare them to nothing better than to English Cocks, which, though they exceed all others upon the Pit, can yet contentedly riot upon a Dung-Hill.

But, to their Honour be it spoken, considering the many Hardships and Difficulties which they had to contend with in the last War, they sometimes even out-did themselves, and performed Wonders. Though, like the finny Tribe, they derive their Livelihood from the floating, turbulent, unsteady Element, and their Bread is cast upon the Waters: yet they have been often obliged to pull it out of the Fire too. As if they could not enough distinguish their Bravery without courting Danger, they have often engaged betwixt a double or treble Fire of the Enemies Cannon; that so, like that very Gold which they at once covet and despise, they might by such a Purification, appear with the greater Lustre. Yea, when they have been over-powered by a much superior Force, they have disdained to strike to French Colours, but in the last Extremity; and when their wooden Castles became so leaky, that the Deep was ready to swallow them up. But, amidst all their brave Engagements, and their many signal Feats at Sea, it is reasonable still to suppose that they would have performed more, had the common Sailors been as sober and temperate as many of the Commanders and inferior Officers, under whom they fought.

But among all the valiant Exploits at Sea, I should be wanting, in Respect to my quondam Parishioner Captain Philips, did I omit to mention his gallant Resolution in cutting an English Man of War out of a French Harbour. An Action not unlike that of Jason, so much celebrated in antient History: the bringing back the Solebay, together with two Hundred and fifteen French Prisoners in it, from the Road of St. Martin's, being, to all Human Appearance, as impracticable as the fetching the Golden Fleece from Colchos.

As this Action stands singular in the English Annals, so the British Argonaut's Misfortune was singular likewise. For his not being bred in the Navy excluded him, by the Rules thereof, from the just Reward of his Merit. His Majesty, however, was graciously pleased to distinguish him, and to bind him, as it were, by the strongest and most significant Tie of his Royal Bounty: namely, by a Gold Medal affixed to, and pendent on, a treble Gold Chain. But the Command of his own Prize was what he had at Heart; as it would have afforded him more Room for the Display of that Bravery, which, for want of a stouter Ship, he afterwards signalized upon the Indian Coast, in a diminutive Packet-Boat.

Having thus paid my Acknowledgments to the English Soldiers and Sailors, it would be but a low Compliment passed upon them to say, French Brandy is not good enough for them. Could I render English Cyder like the famed Nectar and Ambrosia of the Heathen Gods; or the more modern, but no less fictitious Liquors of Aurum Potabile, to make them immortal, and so to cause their Lives to be as durable as their Fame, I should not think it above their Desert. But, as they would still covet a Sip of the right Nants, or Coniack: so, if a Cordial Whet is to be indulged to any who are not under an actual Deliquium; those surely have the best Title to it who fight our Battles: and who, upon a Push, may require just as much as will suffice to blunt the sharp Sense of Danger, to quicken their Spirits, and to push them on to Action.

But let them ever remember, that true Fortitude cannot be instilled from the Alembick. It flows from a much nobler Fountain; namely, from the steady and immutable Principles of Religion: which arms its true Professors with Courage in all Extremities. It will not permit them tamely to yield unto, or sneakingly to draw back in, the most threatening Dangers: where the Rights and Interest of their King and Country do demand their Assistance. For "Christian "Heroes (to use the Words of a late * Military "Person upon the same Subject) will expire in "Heaps before his Pavilion, to guard the im- "portant Life of their Sovereign; and, in the "joint Cause of Heaven and Earth; of our "Religion and Liberties, destroy like ministring "Angels, or die an Army of Martyrs."

* *Mr. Steele's Christian Hero.*

When the Reader considers that we are just upon the Brink of a bloody War, he will pardon a Digression, which is meant to whet the Courage, and to fix the Resolutions of those, who are like to be concerned in the most busy Scenes of it. And howsoever the English may be represented by a neighbouring Power (like Poly-

PHERMUS in LUCIAN) ſtrong, but blind: yet we truſt that (through the Goodneſs of that Providence which hath ever befriended us) we ſhall be ſupplied with the Eyes of ARGUS, to watch and direct the State, as well as with the Hands of BRIAREUS to fight our Battles.

A Change of Topicks in Writing, as well as of Buſineſs in Huſbandry, ſerves for Amuſement. If theſe Political Remarks do not afford the Reader that Sort of Entertainment, which the Title Page gave him Reaſon to expect throughout the whole Eſſay; I muſt frankly confeſs that the Subject is of ſuch a barren Nature, and lies ſo much out of the common Way of Writing, that, like the Apple itſelf, it will not afford any Juice without ſqueezing. I have therefore been ſometimes at a Loſs even for Words to cloath and convey my Sentiments in, ſo as to render them intelligible. For Cyder, though a liquid Subſtance, is yet a very dry Subject to write upon. Hence it came to paſs, that in his celebrated Poem upon it, Mr. Philips, though a Writer of a very lively Fancy, found himſelf obliged to make many Excurſions into Similitudes, Perſonal Characters, and other Amplifications, quite foreign to his Favourite Nectarian Juice. Some of his Obſervations I have referred to; and they are ſet down without mentioning the particular Page. Since the Review of the firſt Manuſcript Copies, many freſh Hints have ſtarted up, which are inſerted here. They could not, without ſome Reluctance, be either prevented or ſuppreſſed: the Conceptions of the Mind being like thoſe of the Body; and, when once formed into a Fœtus, the Burden encreaſes daily.

Several worthy Gentlemen have deſired to ſee theſe Cyder Directions printed for the common Good; and have offered a handſome Encouragement for their Publication by Subſcription. But when I made a Motion to one or two of them, for their Patronage of them, they modeſtly refuſed to have their Names prefixed to an Art, which they did not pretend to have the Skill to protect, becauſe they did not underſtand the Art itſelf.

The Veſſel is therefore launched, without a Pilot, into a wide Ocean of Contradictions: into a World of Yeas and Nays: of Commendation and Blame: of good Report and evil Report: of Praiſe and Calumny. As it is thus committed to the Rage of Wind and Storm, it only remains that I wiſh it a proſperous Voyage, for the Benefit of Poſterity; and ſo I bid it Adieu.

End of the ELEVENTH BOOK.

A COMPLEAT BODY OF HUSBANDRY.

BOOK XII.

Of the Accidents to which the Cattle and the Crops are liable.

The INTRODUCTION.

AS it has been our Custom in the preceding Parts of this Work, not only to inform the Husbandman of such Things as it is necessary for him to know; but to explain them as minutely and exactly as we are able, that by being familiar to his Understanding, they might be imprinted in the more lasting Manner on his Memory: we shall endeavour to prosecute the same Method here, though in this Case more difficult than any other. There is the more Reason for attempting it, because such a Knowledge is in no other Article so necessary. The Accidents we are about to treat of are of the most important Kind; and if the Causes of them be not properly understood, they never can be prevented. For this Reason, we shall in the first Chapters of this Book examine into, and so far as that can be done, explain to the Husbandman the Nature of such Incidents in the Air and Elements which are the Occasions of many of them; that

that by underſtanding in what Manner the Hurt is done, he may know what are the Means in his Power, if there be any, to prevent or guard againſt it.

Under this Diviſion we ſhall alſo conſider the Meteors, as the Learned call them, Rain, Hail, Snow, and the Reſt; and inſtruct our Huſbandman how far he may be able to foreſee them, and conſequently be prepared to guard his Flock and his Crops againſt the Danger they naturally would receive from them.

After we have thus enquired into the Cauſes, we ſhall trace the Effects in thoſe Diſorders they occaſion in the ſeveral Parts of the Huſbandman's Concern; and thus endeavour, under this moſt important Head, to lay down in a few plain Words a Syſtem of *Rural Philoſophy*; which if not enough to ſatisfy the utmoſt Curioſity of idle Minds, ſhall yet offer every Aſſiſtance that has been diſcovered to ſerve the practical Farmer.

CHAP. I.

Of Heat conſidered in itſelf, and its Effects on the Stock and Crop.

THOUGH Heat be the very Principle of Life in the Univerſe, yet it may be attended with fatal Conſequences to every Thing in Nature. The Degree determines the Utility of every Thing; and in the preſent Caſe, that which when moderate is the Support and Preſervation of all Things, when exceſſive is their Deſtruction.

We are not here to enter into the Effects of Heat in the Condition of actual Fire, which diſſolves, diſſipates, or deſtroys all known Subſtances; but that Degree of it only, which may be in the Temperature of the Air. The Farmer will not bring Metals to the Furnace, nor expoſe Gold or Diamonds to the Power of great Burning-Glaſſes, which in their full Force ſcatter the one, and ſplit the other to Shivers: theſe are the Amuſements of Philoſophy; we are concerned only with its Uſe. We ſhall confine ourſelves to the Nature and Effects of that Degree of Heat which is at times felt in the Air, and to its Influence upon the Cattle and Produce of the Ground: and as we limit this Work to the Service of the Farmer, we ſhall advance nothing but what ſtands on certain Proof, and what his Reaſon will find it eaſy to comprehend.

Our Iſland is ſubject in the Summer Months to very conſiderable Heat, when Accidents conſpire to continue it unallayed. Nature has ſo well adapted the Creatures of the Iſland to this, that they are none of them deſtroyed by it; nor the ſmalleſt Plant, unleſs irregularly expoſed to it: but its Effects are very hurtful, though not ſo great as utterly to kill them. We ſee Cattle fainting and loſing their Fleſh, and Plants fading and drooping, according to the Degree of the Heat; and this the Farmer is with his Care to prevent, by Shade and Shelter for the one, and by watering the other when needful.

Many Plants, and moſt Animals, bear the Effect of Cold better than that of Heat, for this plain Reaſon, that the Cold only condenſes their Juices, whereas the Heat diſſipates them.

The Effects of this Temperature of the Air are more ſenſible on Plants than Animals; wherefore we ſhall principally conſider them in that Light.

Many Plants will grow in a very conſiderable Degree of Cold: but when it comes to freezing, tho' a Multitude endure it and keep alive, yet few have the Vigour to ſhoot. The ſlighteſt Froſt ſtops the Growth of moſt Plants, and a Degree ſomewhat ſtronger it ſtops that of all.

This is a Principle perfectly eſtabliſhed by Experience, and the Farmer will learn from it what he is to expect with Regard to his Winter Crop.

Young Plants ſuffer more by Froſt than thoſe ſomewhat advanced in Growth; therefore let him provide for ſuch as are to ſtand the Winter accordingly, and expect from them Nothing but what Nature will ſupport. Let him ſow them in ſuch Time in Autumn, that they may have ſome Strength before the Coming in of Froſts; and let him expect little more from them during Winter, than to eſtabliſh themſelves well in the Ground. In the Days of Froſt he ſees they can only ſupport themſelves alive, for to grow in that Time is againſt the Courſe of Nature; therefore what little Shoots they can make muſt only be during the open Weather; and theſe will be ſo checked by the Return of the Froſts, that there cannot be any great Progreſs.

As Nature has provided for the ſupporting the Generality of Plants alive during the coldeſt Weather we have in this Iſland, we are to be under no farther Concern on that Head; but to examine the various Degrees of Warmth and Heat; riſing from this, to the Extream of what our Seaſons afford.

The Warmth of the ſofter Winter Months brings Plants a little forward; the gentle Heat of the Spring makes them ſhoot apace; the greater Heat of Summer ripens their Flowers and Seeds; and even the greateſt as we have ſhewn is not enough to deſtroy them, unleſs the Negligence of the Huſbandman join with it.

A gentle Warmth puts the Sap of Plants in Motion; and the greateſt Power of it within Moderation, unites and cements their beſt Juices for the Formation of their moſt uſeful Products: but when we come to a Degree any thing conſiderably greater than this, it operates in a Way directly contrary to what we have named, ſeparating and diſperſing their beſt Particles, inſtead of bringing and uniting them together. It is therefore a Plant puſhes out its Flowers, and ripens its Fruit or Seed in this moderate Degree of Heat; but in the Extream fades and decays.

Many a Crop that might have produced very well is loſt, or comes to little, for Want of the Farmer's proper Aſſiſtance. Different Soils and different Situations make Plants bear Heat differently, ſome better, others worſe; as alſo their ſeveral Kinds. We have told the Huſbandman what Species ſuit what Soils and Expoſures beſt, having always kept this Article of Heat in Mind; and with proper Regulation there is ſcarce any ſuch Thing as a Crop's utterly failing this Account. When we conſider how much hotter ſome Countries are than ours, this will appear

pear leſs ſtrange; for there are Plants which live in the hotteſt of them.

Experiment ſhews what would ſcarce elſe be credible; reſpecting this Article, Dr. Hales, whoſe Veracity or Accuracy never have been or will be queſtioned, aſſerts, that Plants will endure without Prejudice a greater Degree of Heat, than that of Water made as hot as that a Perſon can but juſt endure to hold his Hand in it without ſtirring it about. He has therefore fixed upon a larger Degree of Heat than this for the utmoſt which Plants will bear, and aſcertains it at that Heat of Water upon which melted Bees-Wax begins to harden.

This is an Experiment very happily choſen, ſince Bees-Wax being a vegetable Juice, tho' collected by the Bee, ſuch a Degree of Heat as would abſolutely diſſolve that, muſt be the utmoſt Point Plants can bear.

This explains to the Farmer how much his own Neglect is to be blamed at many Times, when he gives up his Crop as ſpoiled by Heat: this is a Degree of it to which Plants never will be naturally expoſed with us: therefore he may for his Satisfaction eſtabliſh this Maxim; that if he conduct himſelf properly in all the Articles we have named, in the ſowing and Management of any Crop, it will never be loſt by Means of the Heat.

If a Weather-Glaſs of the common Make be divided into a hundred Parts from the Degree of Cold at freezing, to this Degree of Heat determined by the melted Wax, it will give all the Degrees of Heat to which Plants will ever have any Reference. Few Houſes are without a Weather-Glaſs, and the Farmers never ſhould. The Kind made for this Purpoſe is that called a Thermometer, and the Huſbandman will do well to have one with this Diviſion, which will come as cheap as any other. This will ſhew him at all Times what is the Degree of Heat in the Air, much better than what he feels at random by his Body; and according to this he will know in what Degree of Health, or in what Danger his Crop is from this Article.

In a Space thus divided, ſixty-four Degrees is about the Heat of the Blood in Animals. Experiments have ſhewn, that the Heat of the external Part of the Body is that of about fifty-four of theſe Degrees: the Heat of Milk as it comes from the Cow is fifty-five Degrees; which Degree is about the ſame that ſerves for the hatching of Eggs; and that of new made Urine is about fifty-eight.

Theſe Degrees of Heat being known, with Reſpect to the Parts and Bodies of Animals in Health, they give us a Mark by which to know their Sickneſs; and the Compariſon of what Degree of Heat our Summers commonly afford, with what Plants will bear, which is perfectly known by this Method, will farther confirm to the Farmer what we have aſſerted already, that when his Crops fail, as is ſuppoſed by Heat, it is not by the abſolute Effect of that, but by his Miſmanagement joined with it.

The common Degree of temperate Weather in this Diviſion is about eighteen Degrees; and the great Heats of Summer will raiſe it to eighty eight Degrees. This is a vaſt Advance; it is four and twenty Degrees hotter than the Blood of Animals naturally ſhould be: but even this, though without Care it will make Cattle faint, and expoſe them to Diſorders, yet is no leſs than twelve Degrees below the extreme Heat that Plants will bear without Prejudice, if they be properly managed.

There are Countries in which the Plants all endure this Degree of Heat many Months, for ſeveral Hours each Day, and more; but what is ſeen in them verifies what we have told the Huſbandman. They hang their Leaves and fade, and would be killed by it, but that they are ſupported and refreſhed by the great Dews of the Evenings and Nights in thoſe Places.

Nature has for this Reaſon made many of the Plants of thoſe hot Regions of ſuch a Form, that they have no Leaves; theſe being the Part that ſuffers moſt readily by the Violence of Heat.

Though we have named the Height of eighty-eight Degrees, as what the Weather ſometimes arrives at in our Summer, the Farmer is not to imagine that every Summer is ſo hot; much leſs that every Plant muſt of Neceſſity be expoſed to ſuch a Degree.

The common Heat of a Summer Day in the hotter Months, and in the Middle of the Day, is about fifty Degrees of this Meaſure. There is a great deal of Difference between this and the Heat marked at eighty-eight, which yet is twelve within what Plants may bear. But yet this is a Degree of Heat to which his Cattle are not expoſed, tho' a great many Parts of his Crop are. At thoſe Times when the Heat is at fifty Degrees in the Sun, which is to be called a Summer Noon-tide Heat, it is but thirty-eight Degrees in the Shade. The Farmer ſhould carefully obſerve this Article, that he may ſee what a vaſt deal is in his Choice by a proper Management. 'Tis true that the great Heats of Summer ſubject his Cattle to many Diſorders, as we ſhall preſently ſee at large; but he ſees here, that it is in his Power to moderate that Heat twelve Degrees in fifty by a proper Shade.

Motion encreaſes Heat to a very great Degree, therefore let him take care, that when the Days are hotteſt his Cattle are kept the moſt quiet. In the ſame Manner, as the Middle of the Day is the hotteſt Part of it, let them be kept particularly quiet during that Time. Theſe are Rules founded on plain Reaſon and daily Experience, yet though plain and obvious they are not ſufficiently regarded. The Huſbandman may, by an irregular Proceeding, heat his Cattle as much in May, as the Nature of the Seaſon would do in July: and on the other hand, by proper Hours of Reſt, and due Shelter, he may in the Effect reduce the moſt extreme ſultry Weather to the Condition of temperate.

With Reſpect of Plants, an Obſervation of the Degree of Heat, and of their general Condition and Progreſs, will ſhew abundantly the Truth of what was before aſſerted, reſpecting the Effect of a moderate Heat for promoting their Growth, and the Effect of a greater Degree of it in ripening their Seeds. At a Medium the Heat is in April at about fifteen Degrees. This with the Aſſiſtance of the Rains at that Seaſon ſets the Plants to ſhooting. In May

and the Beginning of June it advances from that to twenty, twenty-five and thirty Degrees; and in this Time they grow moſt, and ſtrengthen themſelves beſt. After this come the more extreme Heats, and the Seed ripens. In general the Degrees of Heat between twenty and thirty, are thoſe moſt ſuited to the Growth of Plants. If we may be allowed to give a Sort of general Calculation for the Reſt of the Year, we may ſay that the common Heat of the Beginning of Spring, and the Decline of Autumn, may be reckoned between ten Degrees and eighteen; and the Winter Heat within ten Degrees of the freezing Point.

CHAP. II.

Of Drought, its Nature and Effects.

WHEN the Summer Months beſide being extremely hot are alſo extremely dry, the Farmer's Crop never fails to ſuffer greatly, unleſs well aſſiſted by Art. In the hotteſt Countries there are the largeſt Dews; and in the ſame Manner, in our hotteſt Seaſons the greateſt Quantity of Moiſture is exhal'd from the Earth, and ſerves to refreſh the Herbs again in its Fall; but it is not enough to preſerve them in Vigour. Nature intended for them the Aſſiſtance of Rains, and when theſe are with-held, the Huſbandman muſt ſupply the Defect by his Induſtry.

The Products of open Field Land are moſt expoſed to the Damage that is ſuſtain'd from Drought, and Corn more than Paſturage; yet none are exempt. In Seaſons but ſlightly droughty the open Field Corn ſuffers, and the Farmer reaps but a poor Harveſt; and in the Extream of this unfavourable Weather there is little Graſs for the Cattle.

The Stock thus ſuffers by Means of the Scarcity of Food; and commonly there is great Want of Water for them at the ſame Time. Theſe, added to the natural Diſorder of their Bodies from the Heat itſelf, are Sources of many Diſorders; ſo that it is a very important Concern to the Farmer to make the beſt Proviſion againſt the Damage that he can, and to do all he can to remedy it when it happens.

The Method of preventing the Effects of Drought is pointed out by Nature: indeed the Huſbandman's whole Practice is ſo, if he would but follow her Steps. Let him ride about the Country in the Extreams of a droughty Seaſon, and obſerve the Effects of it on Lands that lie differently. We have obſerved that it is in open Fields the Effect is worſt; and in the others he will ſee the Damage leſs as the Encloſure is better. This may ſhew him that the proper Guard againſt the Accident of Drought, is by keeping up his Fences, and planting them well with Trees. We have ſpoke of this before, and recommended it very warmly upon the Conſideration of its Advantage in Reſpect of Wood: here is another and a very great one. The Effect of the warm Sun upon Plants of the ſame Kind in open Ground, is ten Times greater to do them Harm, than in ſuch a one as is well encloſed: we have ſhewn its Heat is greater, but that is not all; Droughty Seaſons are always attended with burning Winds: theſe parch up the Plants which the Heat only faded; and againſt theſe three joint Cauſes of Miſchief no common Plant can well ſtand. 1. The Heat diſſipates and evaporates a great Quantity of the Juices. 2. There is no Recruit from Showers for a Continuance of Time, and the Evaporation is all the while daily repeated; And, 3dly, The dry Winds follow, to ſhrivel up what the Sun had faded. Theſe are natural Conſequences; the Leaves wither and droop, no Moiſture comes to refreſh them, and Winds parch them up: they muſt fall off. We have, in a preceding Part of this Work, ſhewn what are the Nature and Uſes of Leaves on Plants; and it is plain the Loſs of them muſt be very deſtructive to the Whole.

We have laid down the Cauſe of the Miſchief Plants receive from Drought, to ſhew the Farmer the Propriety and Neceſſity of what we are propoſing by Way of Remedy. The Heat and Drought do their Damage but partially and ineffectually, unleſs the Winds come in to their Aſſiſtance. A Plant may droop and hang its Leaves from Day to Day for a conſiderable Time, and yet upon a ſmall Shower it will recover: but when a parching Wind blows over it upon the Heat, in that drooping Condition the Leaves fall, and then no Rain recovers it to any Purpoſe.

Now the Expoſure to theſe drying Winds appears to be the Thing that compleats the Deſtruction of the Plants; therefore the Farmer's Buſineſs is to guard againſt that. The Elements will not obey his Pleaſure, but he may defend his Crop from this Miſchief of Winds. The Sun will dart its Rays in Spite of all his Caution; and there is no Art by which he can make the Clouds drop their Treaſures of Water: to theſe therefore he muſt ſubmit; but the Miſchief of theſe is but partial and ineffectual without the Winds that follow: and tho' he cannot prevent theſe, he can guard his Crop againſt them. To this Purpoſe let him thicken his Hedges at the Bottom, and plant Trees in Abundance, that will grow to a Height, and almoſt meet by their Branches all the Way up. This will be a Defence not only againſt the Winds, but in ſome Meaſure againſt the Sun. The Thickneſs at the lower Part will perfectly well break the Force of the former, and the large Shade ſpread over the Field for a great Part of the Day by one or other of the Hedges, will defend the Growth againſt the latter. The Plants thus ſheltered will enjoy a State of the Air by many Degrees cooler, than if the Sun had its full Effect upon them: and there is another Advantage too little conſidered, which is, that the Number of Trees will, by the great Quantity of watery Matter they perſpire, render the Air leſs ſcorching.

The Profit of Wood will alſo recommend this Method of Shelter, for it is very conſiderable: on all Accounts we adviſe the Farmer to fall into the Practice, but ſtill within the Guidance of Moderation; tho' we adviſe him to thicken all his Hedges about thoſe Places, where from the Situation Drought is like to be moſt deſtructive; yet we mean this ſhould be done in a prudent Manner.

ner. The larger the Field the loftier ſhould be the Trees. For common ſmall Encloſures a well grown white Thorn Hedge, managed as we have directed, is a ſufficient Defence: in thoſe of a larger Extent the Pollard Hedge, of which we have given a Figure and Explanation from the Hand of an ingenious Correſpondent, will be the moſt proper; and for the largeſt, tall Elms, and other Trees of the like Kind, which are to be indulged in ſpreading out their Side Branches, provided they do not over-hang the Ground too much, or ſtarve the Head.

For this Purpoſe we ſhall adviſe the Farmer, in ſome Degree to imitate the Practice of the Gardener in his cutting of thoſe Trees, which he means ſhould grow fan Faſhion. Let him cut off the Boughs of theſe Elms and other Trees that grow toward one or the other Field, and encourage ſuch as run parallel with the Courſe of the Hedge. This will have a great Advantage: the Side Boughs will thicken, and will be a better Shelter and Defence, and the Growth will at the ſame Time ſuffer nothing from their Overſhadowing or Drippings. There muſt be always a fine leading Shoot left for the Top, to carry up each Tree in Height, while it is thus ſpreading Breadthwiſe; and with all the Advantage there will be a great deal of Beauty. This is a Thing not to be conſidered by the Huſbandman, at the Expence of Convenience, but when it falls in with that, 'tis certainly worth Regard. The judicious Eye abhors the Gardiner's Practice of clipping up Trees in this Manner in ſtrait Lines, Leaves and all, till they reſemble a Wall, becauſe it is ſtiff, formal, and out of Nature; but what we adviſe the Farmer to do, which is no more than cutting away ſuch large Boughs as ſtand ſtrait forward, will have a moſt pleaſing Effect. There will ariſe from it a Flatneſs and Breadth ſufficient to pleaſe the Eye, though not ſo formal as to offend it; and the remaining Branches will give the whole an Air of perfect Nature: ſuch Trees will look only as if they had chanc'd to have grown very prettily. Every Field will thus have the Aſpect of a Garden, only more natural and more beautiful.

CHAP. III.

Of the Care of the Fields in the Management of Shelter.

THE Huſbandman will ſee that we have thus contrived for him an eaſy, and a very effectual Remedy againſt the principal Danger riſing from Drought; but he will naturally obſerve, that theſe Hedges muſt be cut, and theſe Trees lopp'd at Times; and it will be natural to aſk, what is then to be the Defence of the Crop? The Anſwer is not difficult, nor is this any great Inconvenience. The Improvements introduced of late Years into Huſbandry, give the Farmer a great Advantage in the Variety of Crops; and he will find that Change in no Reſpect more ſerviceable than the preſent.

There are Plants which will endure Drought much better than others; and theſe he muſt contrive to have upon his Lands at the Time when he is to cut his Fences. This will not be difficult, becauſe the cutting theſe is always in his own Choice; he may not only do it when he pleaſes, but he may know a Year or two before hand, and provide accordingly.

The general Rule is, that the deeper Plants root the better they reſiſt Drought; and the Reaſon is very obvious, becauſe Drought affects Herbs only in Proportion to their want of Reſources againſt it, and theſe Reſources are always greater the deeper they are ſought. A little dry Weather will parch the Earth about a ſlight rooted Crop; but it muſt be a long Continuance indeed that can affect it to the Depth ſome of the new introduced Plants reach.

We have explained this Matter of the deep and ſhallow rooting of Plants in a preceding Part of this Work, therefore ſhall not repeat it here; but ſhall give the Huſbandman this general and univerſal Caution, that he proportion the Growth to the Condition of the Shelter. He will always know at what Time it will be bare, at what Time it will have grown to a moderate Defence, and when it will be in its full Perfection: therefore let him, againſt ſuch Years as the Shelter will be moſt perfect, ſow thoſe Crops that root the moſt ſlightly, and leave the Ground moſt open between them, for they will leaſt of all bear Drought. This laſt-named Article is more important than is imagined, for the Earth parches much ſooner where it is expoſed between the Plants, than where their Branches ſhelter it; and on this depends greatly the different Effect of Corn and Pulſe upon the Ground.

The Huſbandman's own Diſcretion will carry him on to ſow, for the Time of middle Growth of his Fences and Trees, ſuch Crops as require a moderate Shelter, but will not very eaſily be parched up: but the great Conſideration is with Reſpect to the Years in which the Fences will be bareſt. We have directed him to ſow ſuch a Crop as requires moſt Shelter, at that Time when the Hedges and Trees are thickeſt. We will ſuppoſe this the Year before the Trees are to be lopped, and the Hedges cut down: the next Seaſon therefore is to be that in which the Fields will be left moſt of all expoſed; and conſequently, if a droughty Year come, the moſt diſadvantageous.

Of all the Plants introduced into the Huſbandman's Profeſſion, Saintfoin is the deepeſt Rooter, and it beſt ſtands theſe Accidents; therefore let the Huſbandman provide a Crop of this againſt the cutting of his Trees. Let him ſow it early, and as it will then enjoy the Benefit of the thick Shelter while young, it will thrive ſo well as to eſtabliſh itſelf in the Ground before the lopping and cutting. It may then be left to Nature: it will ſtand the Expoſure made by this neceſſary cutting the Fences; and as it is a Crop that laſts ſeveral Years, it may very conveniently be continued upon the Ground while the Fences are growing up, and the Trees recovering their Branches. When they are grown ſo as to afford a good Shelter again, the Saintfoin may be broke up, and the Ground will be in excellent Condition for another Crop.

We have mentioned Saintfoin as an Inſtance, but the Farmer is not tied down to this only

Plant,

Plant, he may take his Choice among all the deep Rooters, and they will bear this Management, ſerving him very well during the expoſed Years, and preparing his Land for Corn.

It is well known that dry and barren Lands ſuffer the moſt from Drought: therefore this Care ſhould be moſt of all taken with Reſpect to them: the Fences for them ſhould be planted thick, and the Trees at ſmall Diſtances in them; we have before given the Farmer his Choice of ſeveral that very happily ſuit ſuch Soils. In many Parts of the Kingdom, ſince Incloſures have become more general, Lands that were worth little while open, are come to great Value by this Article of Defence. The Crops on theſe Lands are leaſt able to bear parching Winds, and therefore they the moſt evidently of all ſhew the Effect and Benefit of Shelter; but this Effect on them is ſufficient to recommend the Practice univerſally, where there is Danger of theſe Accidents.

CHAP. IV.

Of ſuiting the Crop to the Soil, to prevent the Effects of Drought.

THERE are, as we have ſhewn, certain Soils which are more ſubject to have the Growth on them damaged by the Effect of Drought than others; and there are alſo certain Species which ſhew the Effect of thoſe parching Winds, that attend this Accident more than others, and that are leſs able to bear it: theſe Conſiderations ſingly may be of Service to the judicious Huſbandman, for providing againſt the Effects of this Temperature of the Elements; and when taken together, as we here propoſe to treat of them, they ſerve as a Kind of general Rule for his Practice.

We have adviſed him to look round about him, for the different Effects of the ſame Accidents on various Grounds: we ſhall now carry his Obſervation a little farther, and take in the State of Things in different Parts of the Kingdom.

We ſuppoſe the Farmer ſituated in ſome Spot where there are the common Accidents and common Advantages attending his Profeſſion; but from thence we ſhall now carry his Obſervation to thoſe Places where a great deal of the Land lies low, and in the Way of Damp and of Overflowing. The Soil in theſe Places, as we have before ſhewn, is uſually a rich deep Mould; and where they have the Advantage of any tolerable Plantations about them, they are from their low Situation well ſheltered.

In many Places Ditches are made to ſerve by Way of Fence. But this is an ill Practice on ſuch Lands, for they are by this Means expoſed to all the Damage of parching Winds. It is leſs than on dry barren Soils; but ſtill it is conſiderable.

Theſe Lands therefore we exclude from the preſent Obſervation: we ſpeak of thoſe which lie low, have a rich Mould for their Soil, and tolerable Shelter; of theſe there are Abundance about the Borders of the Fens; and if theſe be examined in the Years of Drought, they will be found then loaded with the largeſt and richeſt Crops.

Hence a Rule of Practice is very eaſily to be deduced. If the Farmer have ſuch Land divided by Ditches, and it bears poorly, while he ſees that of his Neighbours produce well; let him plant the Sides of his Ditches with Willows at moderate Diſtances, and as they have naturally a naked Trunk, let him ſet Oſiers between them. The Method of doing this we have delivered before, and the Effect in this Caſe will be very great. The tall Heads of the Willows will caſt a proportioned Shade, and the Oſiers, which are full of Leaves down to the Bottom, will keep off the Winds.

Only particular Crops will thrive where the Lands lie very low, which is uſually the Caſe where there are theſe Ditch Partitions; but all theſe Crops will receive vaſt Benefit in dry Years from this Fence.

We have adviſed the raiſing of Saintfoin on the Ground, that is to be left expoſed by the cutting of the Hedges, and lopping of the Trees; and we ſhall add, that on this Occaſion it is the Farmer's Buſineſs to ſow his Crops removed from thoſe higher and more expoſed Fields on this Occaſion, upon the loweſt Grounds he has; and thoſe which are beſt ſheltered.

The Saintfoin on the expoſed Ground will ſo cover the Surface with its Branches, that if a hot and droughty Summer follow, it will be much leſs affected by it; and the Herb receiving its Nouriſhment from a great Depth, will flouriſh, becauſe the Sun will not have Power to affect it at that Depth, when the ſuperficial Part is thus ſheltered; while the high Grounds thus ſtand out a Year of Drought in their moſt defenceleſs State, with a good Crop upon them; the lower Lands will, according to their Nature, yield the beſt Crops of all.

On the contrary, if an unexpected wet Seaſon happen, the Crop on the high Grounds will be the ſtronger and finer for it; and thoſe on the lower Grounds muſt be aſſiſted, as we ſhall ſhew when we come to that Head.

CHAP. V.

Of the Effect of Drought on Trees, and the Way to defend them from it.

TREES, like all other Products of the Earth, are liable to be affected greatly by Drought; but it is only while they are young: they are at that Time deſtroyed by it more eaſily than Plants of the herbaceous Kind; but when they are eſtabliſhed in the Ground, they remain unhurt by its utmoſt Violence. In this Experience confirms what is ſo plain from Reaſon, in the Effect of Drought, upon deep and ſhallow rooted Products. The principal Effect of this Accident is on the Surface of the Ground; and when the Root of any thing pierces to a proper Depth, the whole remains unhurt by all that happens above Ground.

We have recommended planting of Trees in waſte Grounds and in Hedges, and we ſhall here obviate

obviate the great Diſcouragement attending that Practice, which is the frequent failing of the Plantation from Drought.

We have, in treating of Planting, mentioned the ſeveral Accidents of Wind and the like, with the Way of guarding againſt them: theſe deſtroy many Trees, but Drought more than all: and this eſpecially where the Plantation is made on an expoſed barren Piece of Ground.

Theſe are the Places where Trees would be moſt deſirable, but from the frequent Failure of them Farmers have entertained a Notion they will not grow. That Nature can raiſe and ſupport them in ſuch Places is evident, becauſe we ſee them wild and of fine Stature, though it is ſo difficult to make them thrive when a Plantation is intended on ſuch Ground.

Let the Huſbandman imitate Nature. That is, let him ſow the Trees, of whatever Kind; and not plant them. And as we have told him what is the great Cauſe of their failing, let him guard properly againſt it.

The Practice of laying Stones or Rubbiſh about the Roots of new planted Trees, is very good, and may be alſo uſed for thoſe raiſed from the Fruit; but we have preſcribed a Method for the ſecuring of ſmaller Crops from Drought, which may, under a proper Management, be transferred to theſe with great Advantage.

The young Tree is the only Conſideration in this Caſe, for when eſtabliſhed it is ſafe; therefore let a Defence be raiſed for it while in that State. It is eaſy to ſow ſomething of this Kind at the ſame Time with the Tree, and they will riſe together.

It is true, every Shrub for Shelter will not thrive upon theſe barren Grounds where we propoſe Plantations, but there are enough that will. A poor Ground in an expoſed Field is the proper Soil for Furze; for we ſee it on the worſt Ground on the bleakeſt Heaths, and barreneſt Hills, flouriſhing well. This therefore will grow from Seed in theſe Places, and nothing can be more proper for the Service. Therefore when the Huſbandman ſets about a Plantation on this Kind of Ground, let him, at a Diſtance round every Spot where he intends a Tree ſhall ſtand, ſow a good Quantity of Furze Seed in a Circular Trench.

This will defend the young Shoot of the Tree from Winds, and alſo from Cattle. By this ſingle Contrivance the Shoot will riſe proſperouſly, and when it is out of Danger the Furze may be cut up for Uſe. Thus will a fair Plantation be raiſed by Nature's own Means; and it will ſucceed in the ſame Way as thoſe which are eſtabliſhed in like Places naturally. They have riſen from the ſcattered Seeds or Fruits of the ſame Kind, and have ſtood their Chance and throve without thoſe Advantages, therefore doubtleſs theſe will do better.

If, after the Furze is removed, the Trees appear not to thrive well, from the Heat and Dryneſs of the Seaſon, and from the Expoſure, let the Farmer order a Bank of Earth a Foot and a half high, and a Yard broad, to be raiſed round the Bottom of every one of them, and they will immediately ſhew the good Effect of it in their reviving; this preſſes and ſtrengthens the Earth about their Roots; and it gives them, in ſome Degree, the Advantage of deep rooting, which we have obſerved to be the greateſt of all Defences againſt Drought.

CHAP. VI.

Of preſerving Water for Cattle in Seaſons of Drought.

WHILE the Crop ſuffers by the want of Rain, the Stock of the Farmer will be endangered by the drying up of the common Reſervoirs of Water: the utmoſt Care is therefore to be taken to preſerve what there naturally is; and to obtain more from other Sources when that no longer ſerves.

The common watering Places for Cattle, where there is not the Advantage of Brooks and Rivers, are certain Pits deeper or ſhallower, dug purpoſely, or on other Occaſions, which receive the Rain of the wet Months from the higher Ground, and preſerve it during Summer. Theſe are ſo eſſential a Part of the Farmer's Concern, that they muſt never be neglected.

Let him take Care to clean them at proper Times, that there may always be a due Cavity or Depth for receiving the full Quantity of Water. The Mud thrown out of them will pay the Labour, ſo it is doubly wrong to neglect it.

Let him examine whether they be well ſituated, and conſider whether they be of ſufficient Bigneſs. If they are not in the beſt Places let him have others dug where they ſhould be; and if they be well placed, but too ſmall, let them be ſufficiently enlarged.

The Obſervation of one Seaſon, eſpecially if it be a dry Year, will inform him how to judge in this Particular.

When the Pits are well placed, and of a due Size, let him obſerve how they hold the Water. If they become dry in the Time when they are moſt wanted, let him look into the Cauſe, and grudge no Price in, every Way, fitting them for the Purpoſe; for there is no Proportion between this Expence, and that which muſt lie upon him to ſupply his Cattle from other Reſources when they are dry.

Two Ways there are of a Pond's loſing its Water, and they are equally miſchievous, but equally within the Reach of Remedy. The Water may be loſt through the Bottom, or evaporated from the Surface, or both may conſpire to drain the Pond, and then there is no Hope of its remaining long in a Condition of Service.

Let the Farmer, when he digs a new Pit or Pond, provide againſt both theſe Accidents; and when he ſees an old one fail, let him examine whether one or the other, or whether both be in the Cauſe; and apply his Remedy accordingly. Let him obſerve how thoſe Ponds are conditioned that hold Water beſt, and imitate by Art what he ſees in Nature. When he caſts his Eyes about in a dry Summer, he ſhall ſee many of the largeſt Ponds altogether dry; and find in the Field many a ſmall Hole well ſupplied. Some old Sallow, or other ſuch Tree, grows at the Edge of it,

and under this the Water keeps quiet, cool, and freſh in the greateſt Heats. Let him examine the Bottom in theſe Places, and he will find it Clay; or if otherwiſe a Coat of ſtiff Mud covers the proper Soil, and anſwers the ſame Purpoſe. This ſhews that a ſound Bottom and a covered Surface are the two great Articles for the preſerving of Water. Therefore let him, in all new Ponds, clay the Bottom well, unleſs they be dug in natural Clay; and in all old ones, that loſe their Water by its ſinking, repair their Bottoms, or coat them altogether freſh. If a good Clay be uſed for this Purpoſe, and careful People employed to work it down, the Remedy is abſolute, for a Bottom of this Kind will hold as well as one of Lead.

When the Bottom is taken Care of, ſo that no Water can ſink; the next Attention is to be employed on Evaporation. The Sun dries up Ponds very much; and the Winds more. This is leſs obvious, but equally true. In their Salt Pits in FRANCE, where they evaporate Sea Water for making of Bay Salt, they find one Day's Sun, with a briſk Wind, takes off more of the Water, than three Days of the ſame bright Sun in a Calm.

The ſame Precaution that defends the Water from one of theſe, preſerves it from the other; this is the ſheltering it at the Edges. Let the Farmer keep in Mind the old Sallow, which he ſees over the Pond that retains the Water in its Hollow, while others are dry. This is Nature's Method, and this he ſhould imitate. Let him plant all about his new made or new bottomed Pond, except in one Place, which is to be left free for the Cattle to come down to the Water; or if it be in common to two Fields, which is a very good Practice, let him make two ſuch Openings. Let all the reſt be planted with any of the Trees that will thrive in a wet Soil; but of theſe none is better than the Kind already named, the Sallow, for it grows quick, and its Leaves do not give any ill Taſte to the Water. The Boughs of theſe Trees, as they grow, ſhould be made to ſtretch and meet from the two Sides, over the deepeſt Part of the Pond. The Sun will thus be kept off, and the Wind will have no Power. The Water will be kept in, and will be clearer than when it is diſturbed by every Blaſt. As none of it will be loſt: there are very few Summers in which Drought will be able to affect it.

If there be any where, in the adjoining Ground, a Spring, that ſhould always be brought in, and a good Conveyance made for the waſte Water; the Conſequence of this will be, that there will be a Conſtancy of freſh Water, and yet the Ground will be kept dry. The frequent Rains with us make our People neglect the Care of theſe Reſervoirs of Water too much; but in other Countries they are extreamly nice and curious about it, and if we took their Example, many of the diſagreeable Conſequences of Drought would be prevented. When the Farmer makes a new Pond, or new clays the Bottom of an old one, let him be careful to do the Work perfectly, for if there be the leaſt Defect where the Water can make its Way out, nothing will do but new working over the whole.

For a new Pond, one Coat of Clay, of eight Inches well ram'd, and another of ſix Inches, covered with rough Stones, is the beſt Method. For the new bottoming an old Pond, a ſingle Coat of Clay, and the covering of Stones, will anſwer the Purpoſe very well and very ſecurely.

CHAP. VII.

Of obtaining Supplies of Water when the common Ponds are dry.

AS the common Ponds will eaſily be exhauſted in a Seaſon of Drought; and the better made ones will ſometimes fail; it is needful to conſider farther what may be done in ſuch Extremity; for a Supply muſt be had ſomewhere, or all will be loſt. Thirſt to Cattle, as well as to Mankind, is more terrible when in the Extream, than Hunger, and is as certainly fatal in the End.

We have mentioned, in the preceding Chapter, the taking Advantage of Springs for the Supply, when they lie near the Surface: when they are not to be found there, they always may be had at greater Depths; and this is the proper Reſource, indeed the only one. Wells muſt be dug in fit Places, when all other Supplies of Water fail. It is often a diſcouraging Thought, to conſider to what Depths it may be needful to dig in this Caſe for Water, and what Expence may attend it; but, on the other hand, there is the abſoute Neceſſity of the Water, and the Certainty of the Supply: for Water may be had any where, if the Expence of digging be not ſpar'd. The Conſtruction of the Earth is ſuch, that there every where run Courſes of Wet at different Depths, uſually near the Surface, and rarely at a great Diſtance under it; wherever they lie they muſt be found on theſe extream Occaſions, or all will be loſt.

When the Well is deep, and the Supply of Water that is required from it is great, there muſt be proper Contrivances uſed for the getting it up. Men may be employed to draw it from ſmall Depths, and in moderate Quantity; where more Labour is required an Aſs may be uſed, or where there is Need, Aſſiſtances may be employed drawn from the Principles of Mechanicks.

The Wheel in which a Beaſt walks to raiſe Water from a deep Well, is a very good Contrivance: a double Wheel, with Coggs, is another excellent Method, becauſe it makes the Draught eaſier than in the common Way. The double Wheel, with a long Line to the Hand, is alſo another Improvement, becauſe the Weight riſes much eaſier.

Where there is a large Stock to be watered, the common ſmall Buckets are not to be uſed, for that would be endleſs; and in Proportion as larger are required, and the Weight to be drawn up is encreaſed, the more needful it is to be careful of the Force and Aſſiſtances in drawing. A very good Way of drawing great Quantities up with Expedition, is to place a large Wheel at the End of the Windlas, four Times at leaſt the Diameter of the Windlas. A thick Rope is to

be fastened to the Bucket; and a smaller of due Length is to be wound round this great Wheel. The Length is to be such, that when the Bucket is in the Water, the small Rope is all wound upon the great Wheel, and the Bucket being filled, a Servant is to take the End of this small Rope and go forward, till, as that unwinds, the Bucket is drawn to the Top.

Those who are not acquainted with the Powers of Mechanicks, can entertain no Notion of the Effect this has. A single Man will thus be able to draw up a Bucket of twenty or five and twenty Gallons, and that with great Expedition, and little Labour. This is a Thing of vast Consequence, when large Draughts are required.

A good Contrivance, in Case of these large Buckets, is to have them made so that they shall fill without turning sideways, and this is very easy. A large Hole is to be made for this Purpose in the Middle of the Bottom of the Pail, and a Cover is to be fitted to it in the Manner of the Sucker of a Pump; in this Case, as soon as the Bottom of the Pail reaches the Water, the Hole will open and the Bucket will presently fill; then, as soon as it is drawn out of the Water, the Cover stops the Hole and it comes up securely. This prevents the sinking of the Bucket, and a great deal of Trouble.

Any Wheelwright will be able to make such a Wheel, and it will be a very good Method to make it with Teeth, and with a Ledge of Wood so falling upon it, that as the Servant moves forward in the drawing, nothing stops the Pail; but as soon as it is high enough, the Ledge of Wood bearing against the Teeth, stops it. The Structure of a common Jack Wheel will explain this easy Piece of Workmanship.

The Way to be most expeditious in raising Quantities of Water by this Method, is to have a Receiver for a great deal of Water placed ready near the Well, and a Trough long enough to reach from the Ledge of the Well to it. This Trough is to be placed under the Bucket, and it will be easy by fastening a Cord to the Cover of the Hole within the Bucket, to pull it up when the Trough is set under; thus the Bucket will both fill and empty without turning down, which will be a great Ease and Convenience in such a large Size.

This is a Method by which the Farmer will be able to supply his Stock always with Water, in Seasons of Drought, but it is expensive, and takes a great deal of Time to begin and finish it. Therefore as the Cattle might be lost while it was doing, if never thought of till wanted, the Farmer in a large Concern, where he sees there may be a Necessity of such Assistance, should have it ready in Time, and at the Expence of his Landlord; for the Well will serve successive Tenants, and therefore is not to be the Charge of one.

Where such Contrivance is wanting, let the Husbandman look carefully about, and see if there be no Place in the higher Ground where the Water is detained. Ponds on the Tops of Hills are not uncommon, and where there is Water above, it is easily brought down to be of Service. In this Case his Care should be to keep the Pond at the Top well sheltered and well bottomed, that all that comes to it may be preserved in it, and then Pipes are to be laid from this to the Place where Water will be most needed. One should be always carried to the House, and another to a Place where the Cattle may be conveniently watered. Thus will a Supply be often preserved, when all others, except deep Springs, fail; and in this Way there is nothing of the Trouble of drawing up and emptying, as in the others.

It is frequent that Springs rise on the Tops of Hills: these will fill such Ponds, and afford a lasting Resource: but without these the Assistance of such a Supply is very common. I shall refer the Reader about London to one familiar Instance. On the Right Hand Side of the Road to Harrow, about a Mile from Paddington, is a very considerable Farm occupied by Mr. Godfrey. It is near the Top of the Hill. After a few more Paces you arrive at the Top, which is a Flat of no great Extent, dropping off every Way again: there is a little sinking in this Ground toward the Middle of the Flat, and in that Place is a large round and deep Pit. This is always well supplied with Water; and from this Mr. Godfrey has Pipes laid, which go to his House, and afford a continual Quantity for all needful Uses.

At first Sight a Person might imagine there was a Spring in this Place; but I have examin'd and found it otherwise. The Soil is all a hard firm Clay; by this Means the Pond is as well fenced to keep Water as if it were leaded; and though exposed some Part of the Day to the Sun, its Depth to the Surface shelters it very well from the Wind. It receives the Water no other Way than from the Rains that fall upon the Flat, at the Top of the Hill; but the Soil there being all the Way Clay, it takes almost all that falls on the whole Surface. Very little is absorbed by the thin Coat of Mould which covers the Clay in that Place, and the rest sinking toward the Pond, is received into little covered Drains, that discharge themselves into it.

Nature has, in many other Cases, given the same Opportunities of supplying a Farm with Water, in Times of Drought: it were well if others had made the same Advantage of them.

This is the most rational and best Method of bringing Water from a higher Place down to the Farm; on the other hand it may often be necessary to bring it up from a lower, when the Cattle cannot of themselves get at it. In this Case Recourse is to be had again to Mechanicks: There are various Ways of getting Water up from below, some suited to larger and others to smaller Purposes; of all others the most convenient to the Farmer will be the Persian Wheel, which we have named before. This is constructed at a moderate Expence, and will last a long Time, being not liable to be often out of Order; and the Quantity it will raise is sufficient for all possible Purposes in the Service of the largest Farm.

CHAP.

CHAP. VIII.

Of the Signs and Notices of Drought to be obſerved by the Farmer.

AS a Continuance of dry Weather in the Heat of Summer is the Source of this terrible Calamity to the Huſbandman, he will naturally be terrified with the Apprehenſion of it, oftener than injured by the Thing itſelf. It will be natural for him, on any long Series of hot and dry Weather, to fear he ſhall not have Showers; and as he will be in the right to provide againſt the Diſaſter as early as he can, it will be of great Uſe to him to make a rational Gueſs, whether the dry Weather that at any Time alarms him is or is not likely to continue.

We ſmile at many of the common Prognoſticks of the Weather; and acknowledge that thoſe which are better founded are uncertain: we could therefore have gladly dropped the entering upon the Subject at all, but that we think it may be of real Service to our Readers; therefore we ſhall lay down ſuch Obſervations, as are moſt likely to inform the Huſbandman what he is to expect; cautioning him never to have Recourſe to them but in continued dry Seaſons, and then to judge of them as we deliver them, not as certain, but in ſome Degree probable; accepting them as the beſt Guides he can obtain, and therefore conſulting them for Want of ſuch as would be leſs dubious.

Prognoſticks of Weather are ſeen in animal and in vegetable Bodies; not only ſuch as are living, but in the Parts and Preparations of them when dead.

It is plain from repeated Experience, that Birds, Beaſts and Fiſhes are warned of the Changes in the Air, by Notices that either do not reach us, or that we do not regard.

We ſee in the Weather Glaſſes the great Effect of Changes in the Air; and we perceive it alſo in many other natural Inſtances.

Theſe all ſhew that Changes of this Kind affect both ſolid and fluid Subſtances; and therefore that we may ſeek for them, and obſerve the Marks of them, as Notices of ſucceeding Changes or Continuance of Weather in almoſt every Object that is before us. In Things inanimate we can only perceive them by Examination. A Board will ſwell againſt Rain; but if we do not obſerve and examine it we ſhall not ſee it: but in living Creatures their Actions ſhew what they feel; their Bodies are affected by the Changes of the Air, and they are guided by Inſtinct, more certain than Reaſon, and more invariable; therefore we may obſerve their Actions as Prognoſticks of what will happen in Conſequence of what they feel.

Theſe Creatures are the more ſenſible of all Changes in the Air, becauſe they live expoſed to it, and can feel no Changes but what are natural: Mankind who live in Houſes alter the Temperature of the Air by Fires, and are by that Means made incapable to judge of its real Variations. The Change from the Air of a Room with a Fire, to that of a Field or Garden, is ſo great, that it quite drowns the ſmall Variations which may have happened in that free Element; rendering them commonly imperceptible, and when they are greateſt of all, confuſed and uncertain.

For theſe Reaſons we muſt conceive that other Creatures are more ſenſible of theſe Changes than we; and as they have Motion and Voice, we are to watch both for the finding out their nicer Feelings.

Slight Changes in the Air are ſo frequent and ſo ſudden, that nothing can be expected to be thus made out from them: therefore let the Farmer never ſeek after theſe Signs of them, but when a ſettled and continued Seaſon of one Kind has made it natural and neceſſary for him to look after every Notice of another.

In this Caſe of Danger of Drought, if there be Herons in the Neighbourhood let him obſerve their Courſe. This Bird delights in a lofty Flight, and will indulge itſelf in it, when Opportunities of ſatisfying its ravenous Appetite do not call it lower. When the Heron flies high in the Middle of the Day, it is a Sign the Dry Weather will continue. The Food of this rapacious Bird is principally ſmall Animals that haunt about the Waters. Fiſh are its Delight when it can catch them; but they are too ſwift in their Motions for its general Supply: Frogs, black Snails, and other ſuch Creatures, are its common Prey. The Dews of the Night call out theſe early in the Morning, and this is the Heron's Time of preying. When the Earth grows dry, and the Sun hot, they retire into their hiding Places, and the Bird indulges himſelf in his airy Flights. This is his Cuſtom in dry Weather: but if there be a Change for Rain, theſe Inſects feel it, and they crawl out of their Holes by Day. The Heron feels it alſo, and Inſtinct guiding him, he deſcends in Search of them: his Flights are low, and he is frequently ſtooping.

Upon this rational Principle depends the Sign of Drought from the Heron's flying high; and it is one of the moſt certain that are to be gathered from the Bird Kind: but it is not on any one of theſe the Farmer is to build his Opinion: Things doubtful are no Way ſo well confirmed, as by being ſupported one by another.

All Beaſts are rendered faint and languid by a Continuance of hot dry Weather; and while they continue ſo, 'tis a Sign the Cauſe will continue. The Farmer, to know what he is to expect in this Matter, ſhould watch the Actions of his Stock: while they ſeem inactive and dull; while they riſe late to their Food, and eat it careleſsly, it is a Sign the Drought will continue. They feel the firſt Approaches of Rain; and before the Farmer ſees the Clouds toward it in the Sky, he may know it will happen by their Conduct. After a long Series of dry Weather, the Sheep will riſe an Hour before their Time to feed. When Rain is coming they and all the other Cattle will feed heartily: their Motions will be briſk, and the Cows and the Oxen will toſs up their Heads and ſnuff the Air with Pleaſure.

When the Farmer has theſe Notices of Rain from the Bird and Beaſt Kind, he may give up his Fear of Drought; for Showers rarely fail to follow. Many more might be named, but theſe after a long Drought are certain the moſt.

To theſe Signs from the Birds and Beaſts we may

may add ſome from Fiſh and Inſects, but they are not of equal Certainty; they will ſerve as a Confirmation of the others, though leſs authentick alone.

If the Farmer has a Pond with Fiſh, let him from time to time look into it carefully. If his Fiſh keep out of Sight the Drought is likely to continue: and on the other Hand, if they come up to the Surface after diſappearing many Days, he may imagine there will be Rain. Fiſh love Air, but it muſt be a moiſt Air; and they feel it even under Water.

This is another though a leſs Reaſon of the Heron's leaving his high Flight when Rain is coming. He has no Chance for Fiſh while they all keep in the deep Water; but when they riſe in the Shallows he may ſurpriſe ſome of them.

Eels keep all Day deep in the Mud in dry Weather; but they will often put up their Heads on the Approach of wet, and ſometimes crawl on the Surface. Theſe, more than any other Fiſh, are the Prey of the Heron; and this is another Cauſe of his leaving the airy Heights of his dry Weather Flight when the Approach of wet calls them out. Added to Inſtinct here may be the Aſſiſtance of Eyeſight. The Sportſmen know from what a Height Hawks will ſee: the Heron has Eyes of the ſame piercing Kind; for all Creatures have their Organs ſuited to their Uſes: and the Sight of Fiſh riſing to the Surface, and of Frogs crawling out of their Holes, may bring this Bird down, as well as the Guidance of Inſtinct upon his Feelings.

In long Droughts Worms penetrate deeper into the Ground. This is natural, for they muſt have Moiſture: their very Skins alſo dry up when expoſed to a parching Air, and it is certain Death to them. In theſe Continuances of dry Weather they rarely come Abroad: and while the Farmer ſees nothing of them or their Caſts upon the Earth, he has Reaſon to fear the Drought will continue.

Theſe are the principal Signs of continued dry Weather from living Creatures; but there yet remain other Obſervations for the Huſbandman on Things inanimate on Earth, and in the Skies: all theſe he is to obſerve; and joining them with the others he will ſeldom be miſled in his Opinions.

When all the Wood Work about his Houſe and Yard moves looſe and eaſy, and the more ſlight or coarſe Works rattle in the Joints, it is a Sign the dry Weather will continue; and when the Surface of Marble or ſmooth Stone in Chimney Pieces and Floors is perfectly dry, it is alſo of the ſame Purpoſe. We ſpeak here of Rooms in which there are no Fires; for they will change the Nature of all theſe Signs.

With Reſpect to the Heavens let our Farmer obſerve the Sun at his Riſing; for he is an ill Huſbandman that is not up before him: if he riſes ſmall and blue, too bright to be looked upon, and in a clear Sky, there is all the Appearance imaginable of a continued dry Time. When there are rainy Vapours in the Air, they enlarge his apparent Bigneſs, and ſhew him of a fiery Colour. In great Droughts the Sun conſtantly riſes of the ſame Size as he is ſeen all the Day, and of the ſame intolerable Brightneſs.

At Night let the Huſbandman watch the Moon and Stars: if they are bright and clear, there is the ſame Reaſon as from the Sun's Brightneſs to believe the dry Weather will continue. If the Horns of the new Moon look particularly ſharp, that alſo is a Sign of its laſting.

All theſe Obſervations depend upon the ſame Principle, the Clearneſs of the Air through which we ſee them. To ſpeak to a Philoſopher we ſhould only ſay, a clear Air in dry Weather is a Prognoſtick of its continuing dry: but to the Farmer we explain the Matter by Inſtances.

The Clouds may give ſome Signs of Drought alſo; though from their fleeting and inconſtant Nature, leſs Dependance is to be placed on them than on the other Tokens. Thus if the Sun ſet red, that is, if there be a light red Sky in the Weſt at Evening, it is a very ſtrong Sign of the Continuance of dry Weather; eſpecially if the Eaſt be free from Clouds at the ſame Time. In the ſame Manner, when only a few light looſe Clouds are ſeen in the Weſt at Sun-riſe, and they ſoon diſperſe, it is a Token of the Continuance of the dry Time.

The laſt Thing we ſhall direct the Farmer to obſerve as a Guide to judge of the Continuance of dry Weather, is the Wind: let him watch this carefully. The North and the Eaſt are the fair Weather Winds in England; the South and the Weſt thoſe which often bring Rain. When the Wind ſeems ſettled in one of the dry Quarters, or in changing goes only toward the other, there is the greateſt Probability that his Birds, Beaſts, and all his other Obſervations, have told him true; and that he is to expect a Seaſon of Drought: and in this Caſe let him prepare for it.

There are leſſer Obſervations to be made for the foreſeeing ſudden Showers and Days of clear Weather in the common changeable Courſe of Things: theſe we ſhall treat of as leſſer Signs under the Article of Rain; but in this Place we are conſidering a Thing of much more Importance than thoſe ſudden Variations.

We have laid down a Number of Obſervations from different Sources, all tending to the ſame Point, the long and ſettled Continuance of dry Weather; the Conſequence of which in the Extream is Drought. When the Farmer ſees one of them, let him examine whether the Reſt hold good; and if they all do, prepare againſt the Accident they threaten; let him ſecure and preſerve his Water upon theſe firſt Notices, and if they continue any Time, as the preſent Examples ſeem to foretell they will, let him begin ſeaſonably to obtain ſuch Recruits as will be abſolutely neceſſary; and in this let no Evaſion take him off, nor any Expence deter him. His Neighbours will be in the ſame Condition with himſelf, ſo they cannot ſupply him; and it is very probable that the Conſequence may be the loſs of great Part of his Stock.

CHAP.

CHAP. IX.

Of Rains.

WE are here talking of the Extreams of thoſe Things, which are in themſelves, when properly moderated, of the utmoſt Advantage and Uſe: Heat was the laſt named, and Moiſture is to be treated of in this Place. Both are needful to the Growth and thriving of Plants; and they are indeed the two great Requiſites to that Purpoſe: but both may be deſtructive, both to the Crop and Stock of the Farmer. 'Tis a Proverb, that the beſt Things when improperly conducted may be the worſt; and it is in nothing ſo true or ſo evident as in theſe Articles. We are not to arraign the Wiſdom of Heaven, which doubtleſs when it ſuffers theſe Evils to fall upon the Huſbandman, by that very Sufferance prevents greater: but in the plain Face of Things, Heat in Exceſs is fatal, becauſe it brings on Drought; and Rain in Exceſs is deſtructive, becauſe its Conſequence is Inundation.

'Tis not impoſſible, that by the vaſt Rains of this late paſt Winter we may have eſcaped the Earthquake that overthrew Lisbon, and ſhook as it ſhould ſeem a third Part of the Globe. This Conſideration may ſtop our Mouths from exclaiming againſt that Providence, which in Mercy to us has been thus ſeemingly cruel: but it is not to with-hold our Hands from relieving us from the Conſequences of this great Fall of Waters. They are not the leſs hurtful to the Farmer, becauſe they may have ſerved ſo great a Purpoſe in the Order of Nature; therefore he is to conſider the Remedies for their Conſequences.

All Lands will receive Damage by violent and exceſſive Rains; but thoſe moſt which lie loweſt. From the higher Grounds they waſh away the Manure that may have been laid on, and even their fineſt Mould; this therefore muſt be repleniſhed: but from the lower Grounds it is neceſſary to remove them, or they become Ponds or Bogs, not Meadows, Fields or Paſtures.

This is an Accident the Farmer ſhould always foreſee and provide againſt. It is more frequent by far than Drought; and with Neglect every Year may bring it upon him.

Every Piece of Ground has ſome Declivity or Deſcent: his Buſineſs is to find that; to cut Channels in Readineſs for the Reception of the abundant Water that ſhall fall upon the Ground, and to lead them according to that Deſcent to diſcharge themſelves at the loweſt Place.

We have ſhewn in the Words of an ingenious and worthy Correſpondent, how accidental Floods may ſerve the Purpoſes of the Farmer in ſhewing him the true Deſcent of his Ground: theſe he is always to obſerve, for nothing will ſo well inform him how to carry his Drains. This Subject having occaſionally treated on before, we ſhall not repeat any Thing here.

Beſide the Damage that may ariſe to the Huſbandman by the heavy and continued Rains of Winter, there are Seaſons at which every Shower may reaſonably alarm him. Theſe are particularly the Times of Hay making and Harveſt. He is for the Succeſs of theſe Operations to ſeize upon every good Hour that comes; and it will be of the utmoſt Importance to him on this Account, to form ſome reaſonable Conjecture what Weather is likely to follow.

It is a Matter of Indifference whether he bring the Scythe into his Meadow, or the Sickle into his Field, one Day or another. There is a Time at which the Graſs has moſt Subſtance, and the Grain is richeſt in the Ear; but this is not limited to a Day in theſe, as in ſome other of thoſe precarious Crops we have named.

The Farmer may be tempted by fine Weather to begin both ſomewhat ſooner than he intended; and he may, on the threatning Preſages of Rain, defer them ſome Days. It is therefore of the utmoſt Importance for him not to deceive himſelf concerning this Article: and as it may with ſome tolerable Degree of Certainty be foreſeen by many Means, we ſhall give here all that have Reaſon for their Foundation, among thoſe Things that are generally ſuppoſed to forebode Rain.

We ſhall here, as in the foregoing Chapter, ſelect thoſe Signs for which there is Foundation in the Laws of Nature, and which we have known Experience to confirm; paſſing lightly over the others, and utterly rejecting the Fancies of weak and credulous People, which have too long impoſed upon the Injudicious.

CHAP. X.

Of the Signs and Notices of Rain to be obſerved by the Farmer.

IN general the oppoſites to all thoſe Things we have ſet down as Signs of Drought are to be underſtood as Notices of Rain: therefore the Farmer recurring to our laſt Chapter on Drought, will there ſee the many Things that ſtrongly preſage Rain, as the contrary of thoſe there named. Thus when the Heron flies low; when the Cattle riſe early to their Eating; when Fiſh ſwim on the Surface of the Water, and Worms crawl frequently out of the Ground; when Wood ſwells, and Marble is wet on the Surface; when the Sun looks big at his riſing, and the Moon and the Stars appear dull; when looſe Clouds fleet about in the Weſt in a Morning, and do not diſperſe as the Sun advances againſt them; and when the Wind is South or Weſt, and changes only from one to the other of thoſe Quarters, Rain is to be expected.

Theſe are the Oppoſites to thoſe Signs we have given of continued Drought: therefore having explained their Cauſes ſeverally there, we need only recapitulate them here to the underſtanding Reader.

To theſe we ſhall add many more Accidents in Nature, which may be underſtood as general Preſages of Rain; and which often precede the lighteſt Showers.

Birds feel the Approach of Rain as other Changes in the Air, and this always with Pleaſure: a moiſt Air ſeems beſt ſuited to the Nature of all the Kinds that are wild with us; and particularly to the Water-Fowl. It alſo brings out of

their Lurking-holes the Myriads of Inſects which are their Food. The Farmer ſhould watch the Fowls of his Yard, and the wild Commoners of Nature, at all thoſe Times when he fears Rain.

If his Geeſe and Ducks prune themſelves, ſeem more than ordinary chearful and lively; and the Crows in their hoarſe Voice caw from the Tops of the Trees, he is to underſtand it as their rejoicing at a damp Air, and the Approach of Rain: theſe laſt named Birds are extremely ſagacious. When they fly about toſſing up their Beaks, and are very noiſy, the Rain is coming: and when they ſtalk by the Sides of Brooks and Ditches, it is near at hand.

When Swallows fly low it is a very well known Signal of Rain, and is founded on the plaineſt Reaſon. The Food of theſe Birds is little flying Inſects, and all theſe unable to bear up againſt the Weight of the Air when loaded with Damp, fly low. The Eye ſees this, and Reaſon confirms it.

The Crying of Peacocks is another known Sign of Rain: it is that Bird's Note of Joy. His Voice is hoarſer than the Crows; but it is, like the cawing of that Bird, a Sign of his Satisfaction.

Among the Beaſt Kind Sheep ſhew the firſt Signs of perceiving the Approach of Rain; it makes them ſprightly: they leap about and play with one another. The Aſs foretels it by his braying, which is alſo his Note of Satisfaction; and the Cows and Oxen by toſſing up their Heads and licking their Snouts.

Theſe are the Signs of Rain being gathering in the Air; but when it is juſt at hand Cattle give other kind of Notice. They flock together to the Hedges, and ſeek Shelter under Trees where they may ſtand till the Shower is over, and whence they may proceed to the Graſs ſweetened by this Sauce from Heaven.

The very Inſects may be of Uſe in this Way to the Farmer; their tender Bodies give them Notice of the Changes in the Air long before Men perceive it. The Bees keep within their Hives, and the Ants leave their buſy Motions, and retire deeper into the Ground. They carry with them thoſe Caſes in which the winged Sex are lying for their Change, as the winged Inſects of all Kinds do. Theſe common People call their Eggs; but that is an Error.

From the Animal Kind we ſhall lead our Farmer for Preſages of Wet to the wild Weeds of the Field, and to the common Products of his Garden. The Poet ſpeaks of the cloſing of the Flowers of common Marygold at Evening: he calls it

The Marygold that goes to Bed with the Sun,

and this, and all the other Flowers which have that Quality, as there are very many that have, ſhut up in the ſame Manner more or leſs when Rain is coming.

The youngeſt Flowers, or thoſe moſt newly opened, have this Quality the moſt ſenſibly; and they are to be watched for it: dry Weather opens them fully; and as wet is nearer or farther off, or as there is more or leſs of it in the Air, they firm or draw together their Leaves in a more cloſe or looſe Manner.

In the Corn Fields the Farmer will meet with a little Plant famous for many Virtues, its Name is Pimpernell, he will know it by its ſmall bright red Flowers: theſe open in dry Weather, and ſhut up againſt Rain. Wet may be foreknown a whole Day before it falls by this Flower; and the Country People in ſome Places are ſo ſenſible of it, they call the Herb their Weather Glaſs.

In the Paſtures he will ſee many Heads of Dandelion gone to Seed: theſe are ſo many Globes of Down in fair Weather; but againſt Rain they contract themſelves, and ſhew a very plain Mark of its coming.

From his Paſture let the Farmer look into his Clover Field, and he will find another Mark of Rain which has been obſerved theſe two thouſand Years: the Clover when Rain is coming ſtands more upright and firm than at other Times; the Stalk is ſwelled and ſtiffer. This is true in the ſame Manner with many other Plants, but in none ſo diſtinctly.

From the Field if we bring him into his Houſe, he will there find alſo the Signs of approaching Wet very frequent and very familiar. All Wood ſwells with the Wet, and the ſofter Kinds the moſt. Deal, which is the Timber of the Fir-Tree, and is one of the ſofteſt of them all, ſwells moſt of all; and its common Uſe in Houſes gives Opportunities of ſeeing it. Doors will not ſhut; for both the Poſts and the Boards of which the Door is made ſwell: Window-Shutters ſtick, and Boxes are hard to ſhut or open: Drawers of the ſame Wood alſo ſtick in their Caſes; and thoſe of other Wood do the like in Proportion to the Kind.

From theſe Things of common and ſmall Concern, let him turn his Eyes up to the Heavens. We have obſerved, that the Sun's looking red and large is a Sign of Wet; and let him mind the Clouds that accompany this Appearance, for they will not only confirm that Rain is falling, but in ſome Meaſure ſhew the Time when it will come.

If Clouds preſently after ſuch a Riſing of the Sun gather in the Sky, and the Air appears thick and watery, then it will preſently rain; and the hotter the Weather, the ſooner the Rain is to be expected from his Appearance.

When at Sun Riſe, or ſoon after, there be a Circle or Part of a Circle of a blueiſh or whitiſh Colour about the Sun, there may be expected Rain ſome time within the Day.

We have before obſerved, that a red Sun at riſing is a Sign of Rain; and the ſame is to be added concerning its looking dull and white. The natural Colour of the Riſing Sun in a clear Air is the ſame that it has at Noon Day, a deep fiery Blue, which the Eye cannot look upon a Moment. When he is dim and faint, and looks white, it is owing to watery Vapours in the Air, and Wet is near.

If the Moon have a large Circle of a whitiſh Colour round her at a Diſtance, it is another Sign of Rain: and when the Stars look larger than uſual, and fainter, and twinkle leſs, it alſo preſages Wet the next Day: this Obſervation of the Stars not twinkling ſo much, the Farmer is to underſtand is confined to the fixed Stars; for the Planets, though larger than they, never twinkle at all.

The Clouds give alſo many Prognoſtications of Wet. When there are many ſmall ones ſcattered

tered about the Weſt in an Evening, Rain is to be expected the following Day.

It is uſual at theſe Times to ſee the Clouds large, thick, and maſſy, ſo that a fanciful Perſon may imagine among them Reſemblances of Rocks and Towers. Theſe are Signs of a great deal of Rain, and often of Thunder.

The Rainbow is a Source of many Prognoſtications reſpecting the Weather; and is not ſufficiently underſtood. In general it beſpeaks a Change: if it appear after a great deal of dry Weather, it foretels a great deal of Rain; but when we ſee one after a great deal of Wet, we may expect fair Weather.

A bright Rainbow in the Eaſt is uſually followed by a great deal of Rain.

Miſts from Waters afford alſo a regular and very certain Prognoſtick of ſucceeding Seaſon. When they are thick in the Morning, and preſently after diſperſe, they are Tokens of fair Weather: but when they riſe to the Neighbouring Hills, and hang in the Air, they uſually preſage Rain, though commonly at a Day or two Diſtance.

Theſe are the principal Notices from the various Works of Nature, which the Farmer is to obſerve as threatening Rain, during his Summer Works; and as it will be of the greateſt Conſequence in Reſpect of theſe to know from all Methods when he is to expect proper Weather, as well as when he is to fear ſuch as will be hurtful: we ſhall add thoſe ſeveral Appearances from all Kinds of Objects, in Conſequence of which he may reaſonably promiſe himſelf a fair Seaſon, for the cutting, drying, and carrying in his ſeveral Products.

CHAP. XI.

Of the ſeveral Signs of fair Weather.

WE have before ſpoke of thoſe continued dry Seaſons in hot Summers, which bring on Drought and are in the higheſt Degree detrimental to the Farmer; but what we are here to ſpeak of is, that Kind of fair Weather which comes in ſeaſonably, and laſts properly and in a natural and uſeful Manner: ſuch clear Seaſons as come between the ſhowery Times, and ſerve for the gathering in the Produce, without Wet.

The ſeveral Signs by which he may probably know ſuch Seaſons are approaching are theſe. A clear Sky in a Morning, and a bright Sunriſing in it, are the natural Tokens of a good Day; and when at Evening he ſets in a light and bright red Sky, and without heavy Clouds, there is Reaſon to entertain good Hope of the next.

Next to the Sun the Moon is to be obſerved. At all Times when ſhe looks bright and clear, and has no foggy Circles round her it is well; but the greateſt Promiſe is from her Appearance a few Days old. Let the Farmer, whoſe Harveſt Time approaches, watch well the new Moon. If he ſee her Horns ſharp, clear, and fine, he may reaſonably expect fair Weather till her Full; and probably enough it will continue much longer.

The Stars give the ſame Token of fair Weather as the Moon, and juſt in the ſame Manner. When they look very ſharp and bright, and twinkle ſtrongly, there is a clear Air, and it is like to continue.

White, ſmall, and ſcattered Clouds at the North Eaſt, are alſo a Token of ſeveral Days fair Weather.

On Earth the Farmer will find Means of Information in this important Article, as well as in the Heavens. Let him look to the Hills, and if he ſees their Tops clear he may expect bright and ſerene Days: even the Stone and Brickwork of Buildings, in ſome Degree, gives the ſame Notice to the Eye. It is ſeen more clear and diſtinct in the pure Air, that brings in fair Weather, than in ſuch as is full of watery Vapours, and precedes and preſages Rain.

Light Miſts, of a white Colour, gathering early in the Morning over Waters, and ſoon diſperſing, are Signs of fair Days.

If a Shower happen, and there be a Rainbow, let the Farmer watch it carefully; if the blue be a ſtrong Colour, and the yellow be bright, it is a Sign of clear Weather quickly following.

When Gnats ſwarm in an Evening, and the Glow-worm crawls Abroad at Night, good Weather generally follow. Theſe tender Inſects dread the Rain as fatal to them, and hide themſelves when Inſtinct gives them Notice of its coming. Their ſwarming Abroad therefore is to be obſerved as an Information of fair Days ſucceeding, given to Mankind by their Actions. Inſtinct guides them; and Man's Reaſon is to be directed by it.

The Bee is alſo a ſure Director. Her little Organs feel the Approach of Wet; and keep her Priſoner in her Hive, or limit her to ſhort Excurſions when it is near: therefore when ſhe flies far, and returns late, good Days are coming.

Next let our Huſbandman obſerve the Birds. When the Kite and the Swallow fly high good Weather is coming. They can ſee their Prey to a greater Diſtance in that clear Air that preſages fair Time; and they love lofty Flights.

When the Sea Birds leave the Shore; and when the Owl hoots ſoftly, gently, and compoſedly, fine Days may be expected.

Fiſh and Inſects join alſo in giving theſe Tokens. When the Roach and Dace leap up out of the Water, and when the Spider hangs its light Webs in the Air, fair Weather is comeing: Experience, more than any certain Reaſon, eſtabliſhes this Token from the Fiſh. As to the Inſect it is plainly the Direction of Inſtinct. Its tender and expoſed Body feels the Change of Air for dry Weather; and Inſtinct directs it on that Notice, to venture out its Threads, becauſe there will be nothing to hurt them.

Laſtly, we ſhall give the Huſbandman a Notice which he is to regard more than any of the preceding, becauſe it anſwers doubly, as a Promiſe of fair Weather for the preſent, and a Denunciation of Rain ſoon after. This is that thick dark Sky we ſometimes ſee for a Continuance of Time, without either Sunſhine or Rain. This is a Thing that frequently happens in England about the Harveſt: and the greateſt Regard ſhould be had to it: it is an unerring

erring Rule, that such a Sky is followed by some fair Weather, and that Rains come soon after. Therefore let the Farmer manage his Business accordingly.

He needs not be afraid of sudden Rain, where there is such a Sky. He may proceed in his Employment, assuring himself that though Rain will follow, there will be an Interval of fair between, which will serve at the same Time to finish his Work, and to give him Notice of Wet to follow, from which he is to guard his Crops.

CHAP. XII.

Of Hail.

HAIL is an Accident much more dangerous to the Gardener for his forward tender Crops, than to the Husbandman, whose Products being at all Times exposed to the Weather, are more hardened: when it happens to be very violent, and the Stones very large, it will do him some Damage; but it is less to be foreseen, and less to be guarded against than any of the other Accidents of Weather. In the warmer Parts of Europe it is often terrible to the Husbandman, because the Heat brings his Crops as early forward in the Field as ours in a Garden: but neither there can he foresee or guard against it.

Those Storms in those Countries are less frequent than in ours, but sharper. The Roman Catholick Religion established in most of those Kingdoms, throws them into the Mockery of Processions, and solemn Rites; and as these Storms never are very lasting, they attribute the ceasing of them to those Solemnities. God, who commissions all these Things for Purposes unknown to Man, though intended for his Benefit, is not to be averted from his settled Intent by their ignorant Prayers. The Pagans who beat Drums when the Sun was eclipsed, were about as wise, and had as much Share in the bringing Light again. Submission under Afflictions, and general Prayers, are the Dictates of Reason in these Cases: the Language of the prudent Heart should be, "Thou knowest what "is best." And the Christian Resignation is, "Thy Will be done."

All the Husbandman can do in these Storms of Hail is, to watch whether they seem to be slight and common; for in these, as we have said, there is very little Harm to him; or whether they threaten to be very terrible: in the former Case he is to leave all to Nature; and in the latter he should be quick in driving under Shelter, all such Parts of his Stock as could be hurt by it; his Lambs and other young Creatures. His Crop he can no more shelter than he can remove it, therefore it must take its Chance; but as we have observed the common Season of Hail is at a Time when that is not of a Growth to suffer any great Damage.

As we have, on all other Occasions, endeavoured to make the Farmer acquainted, in some Degree, with those several Things wherewith he has any Concern, we shall add here a succinct Account of the Nature of this Substance.

He is acquainted with the Nature of Rain, which is Water raised in Form of Vapour by the Sun, and falling again in Drops. These Drops often pass through a considerable Depth of Air, before they reach the Ground; and it sometimes happens that they are frozen by the Way. Every one knows what a frozen Drop of Water must be: it can be no other than a small roundish Piece of Ice; and whoever will examine Hail-Stones will find them such. Observations have been made, in particular Cases, of Hail-Stones of odd Shapes, as long, or flat and thin, and Star-like, but all these are uncommon. With Respect to the long and flat, they seem only the Effect of various Degrees of freezing; but the Star-like Hail, which is observed to have six regular Rays, is of another Origin. Those who have examined these Matters nicely, will find no Difficulty in the accounting for that Shape: it is the natural Form of pure Flakes of Snow. Therefore, as the common Hail consists of Drops of Rain frozen in their Passage through the Air; this is composed of Flakes of Snow, frozen to the Hardness of Ice, in the same Manner. What the more confirms this is, that these starry Flakes of Hail are always thin and light.

Though these fall with less Force and Weight than the others, they are often attended with more Damage, especially to the Gardener; for when they are driven before a violent Wind, their sharp Edges cut off the Blossoms of Fruit Trees like so many Knives.

A very good Practice in Gardens on this Occasion is, to stick in Pieces of Furze Bush among the Branches of the Fruit Trees, to keep off the Hail from the Blossoms. We name this here, because it may be transferred, if there be Occasion, to the Field, if the Farmer have any young Crop for which he is in Fear from Hail Storms; he may with little Labour or Expence stick up large Furze Bushes among it at certain Distances, which rising above the proper Growth will, by their bushy Heads, defend it from the Fury of these Storms in the same Manner as in the other Instance.

This is a Caution never needful, except upon particular Occasions, and they are not to be foreseen. Indeed this is the Misfortune with Respect to all the Damage by Hail, but when there is Notice, as there commonly is, of any very violent Storm, it is worth the Trouble of a little Care. The driving in of Cattle and Poultry is the Principal; and 'tis better this should be done when there was no real Necessity twenty Times, than once omitted when there was.

Mischievous Storms of Hail generally are of small Extent, and may be foreseen a little before their coming, by a thick black heavy Cloud, with Chillness in the Air and Wind.

Toward the End of April, in 1697. there was one of these terrible Storms in Cheshire. A black Cloud of this Kind foretold its coming about a Quarter of an Hour. This was Time enough to have got in the tender Cattle, but the Farmers were not aware of the Danger, and they suffered terribly. The Breadth of this heavy Cloud was about two Miles, and the Course it took before it dissipated was sixty Miles; along all this Tract there was made the most terrible

Havock of every Kind, but not the leaſt beyond or beſide it. The Hail Stones in this Storm were as big as Hens Eggs, Geeſe Eggs, and ſome of the full Bigneſs of a Man's Fiſt. They were Pieces of clear, tranſparent, and very hard Ice, with a white Kernel in the Middle, that ſeemed a little Lump of Snow. Some of theſe vaſt Hail Stones were quite ſmooth, and others rough and ſharp on the Surface. They fell with a prodigious Force, and killed Fowls, Lambs, and Calves: beat down the young Crops of every Kind; and in ſome Places, where the Wind drove them ſlanting, plowed up the very Surface of the Ground, and buried themſelves an Inch or two in Depth; Trees were broke and ſhatter'd to Pieces in many Places; Houſes damaged, and many People that were Abroad much hurt.

The Circumſtances of this Storm are recorded in the Philoſophical Tranſactions, and in many other authentick Writings: this, and other Inſtances, are not recited here for Curioſity or an idle Amuſement: they are to ſtand as ſo many Leſſons to the Farmer: Examples of the Loſſes others have ſuſtained by Neglect of driving in their young Cattle; and Cautions to himſelf for a wiſer Conduct. He ſees what Appearances in the Sky foretel theſe terrible Storms, let him be upon his Guard accordingly, watching when they come, and omitting no Care that may prevent the Damage.

There is recorded in the ſame authentick Papers, another Hail Storm the ſame Year much more terrible than the former. It happened in Herefordshire, in the Beginning of May. Thunder and Lightening preceded it, and for ſometime continued with it, as alſo a violent Tempeſt of Wind, that blew both the Lightening and Hail upon ſome Houſes, to their Deſtruction. Nothing could exceed this but the Hail ſent by the Almighty upon the Ægyptians; nor can any Words, according to all the Accounts left concerning it, ſo ſtrongly or ſo truly deſcribe its Terror, as thoſe uſed on the Occaſion in Scripture, "Fire mingled with the Hail ran along "upon the Ground."

In this terrible Storm not only Fowls and young Animals of all Kinds were killed, but ſome of larger Growth; and ſome labouring Perſons in the Fields, who could not reach Shelter, ſuffered the ſame Fate, their Bodies being black and blue, as if beat to Death with Clubs. Oaks were ſplit: the Branches of many other Trees beat and torn down; and Fields of Rye were, in ſome Places, cut down as if mowed off with a Scythe. The Hail Stones in this terrible Storm were of no regular Figure: many of them meaſured fourteen Inches round *, and they ſeemed Fragments of thick Ice.

* *Philoſ. Tranſact.* No. 229.

The Fields of Rye that ſuffered thus ſtood expoſed: others in ſheltered Places were damaged, but not nearly ſo much; this may ſerve as a Caution to the Farmer, and ſhew the manifold Benefits of Encloſures.

To theſe Accounts of Hail Storms in our own Country, we ſhall add two extreamly ſingular in their Kind, vouched upon the moſt warrantable Authorities, the one of theſe was in Flanders, about Lisle, in the Year 1686. and the other in France, ſo long before as in 1510.

In all Obſervations of Hail Storms with us, they have been no other than Pieces of Ice; but in theſe there has been ſomething more. The utmoſt ours have ever been known to contain, has been a little Lump of Snow; but the others have had ſulphurious Matter either in their Center, or in their whole Subſtance. That at Lisle is recorded in the Philoſophical Tranſactions †, and had this Singularity, that the Stones were not only vaſtly large, but appeared duſky in the Center; and ſuch of them as came down Chimneys into Fires, when the Icy Part was melted, and this brown Subſtance was expoſed to the Fire, burſt with a loud Report. Mezeray, in his Hiſtory of France, mentions the other with all its Particulars. In this a black Cloud, ſuch as we have deſcribed, came over the Face of the Heavens, and darkened the Air like Night: in the midſt of People's Terror and Aſtoniſhment, the moſt violent Lightnings and Thunder burſt from it, and Hail began to fall. This encreas'd in a moſt dreadful Manner, and with a ſtrong and ſuffocating Smell, like burning Brimſtone. The Hail Stones this creditable Author atteſts, were more like Pebbles: their Colour blueiſh, and their Hardneſs like Flint, till they ſoftened in the Wet. He gives an Account of their Size, which exceeds all others, and which, if leſs authenticated, could not be believed: he ſays ſome of them weighed a Hundred Pounds. We are not to wonder at the Damage done by ſuch a Storm. He ſays it killed almoſt all the Cattle, Fowls and Fiſh in the County; and vaſt Numbers of the People ‖.

† Numb. 203.

‖ *Mezeray's Hiſt. de France*, vol. II. p. 339.

In Calamities like theſe there can be no Remedy, and there is no Courſe to follow but Religious Submiſſion. They happen very rarely; and the Damage done by ſuch as are more frequent, is not great.

We have ſhewn the Huſbandman what is in his Power to do againſt it; and in general, where he has a tender Crop, that ſtands much expoſed, we ſhall adviſe him to uſe the eaſy Method of ſticking up a few Furze Buſhes. This will not only be a Defence againſt Hail, but it will break the Force and Fury of ſharp Winds, and keep off thoſe cold Rains, they often carry before them. In all Reſpects it is a Practice ſo cheap, ſo eaſy, and ſo certain of doing ſome good, that we cannot but greatly recommend it.

CHAP. XIII.

Of Snow.

WE have in the laſt Chapter conſidered an Accident that never can be of any thing except Hurt to the Farmer; though according to its Nature and Degree, that Hurt be ſometimes greater ſometimes leſs; we are now to treat of an incidental Thing of the ſame general Nature, which yet always may be, and often is of great Advantage. A deep Snow keeps all ſheltered underneath it; and frequently defends a tender Crop from thoſe ſucceeding Froſts which would otherwiſe have deſtroyed it.

We

We have recommended to the Farmer, on ſome Occaſions, the Gardener's Practice of covering his tender Growths in Winter by Haulm, or the dry Stalks of Peaſe, or the like: the Snow often falls ſo favourably as to perform this needful Service much better for him than he could have done it for himſelf; more generally and more univerſally.

It lies thick upon the young Plants, covering them very perfectly, and defending them from the nipping and deſtructive Winds; it all that Time mellows the Soil; and when warmer Weather comes to melt it in, nothing ſinks down ſo gently or ſo gradually. No Water is purer than that of melted Snow, and there is no Method by which Wet gets ſo thoroughly into the Ground.

Nature ſeems to have conſidered greatly the Products of the Earth, in this Formation of Snow. It never can fall but in cold Seaſons; which are the Time in which Plants want Shelter: if the Temperature of the Air about the Surface of the Earth be warm, ſo that there is no Need for it as a Shelter, it diſſolves as it falls, and makes the fineſt watering imaginable.

Snow is in its Nature like Ice, a watery Subſtance congealed by freezing. When the Air is warmer where it paſſes, it melts and falls in ſmall Rain.

The uſual Shape of the Flakes of Snow, we have mentioned in ſpeaking of the particular Kind of Hail which is ſtellated, or compoſed of Rays like a Star. Its moſt perfect Appearance is in Form of a Star of ſix Rays, and its Subſtance clear tranſparent Ice: but this is not its conſtant or certain Figure, the Flakes are frequently imperfect, and often leſs regularly frozen: and all this depends upon the ſlighteſt Accidents; the Height from which it falls, and the Degree of Cold in the Air.

Often there are little Points upon the larger Rays; and not unfrequently the Flakes are altogether ſhapeleſs and confuſed, the Snow having melted in the Air, and froze again.

There have been Inſtances of coloured Snow falling in certain Places, and it has been conſidered as foreboding ſome terrible Calamity. There is Account of a red or bloody Snow by an ITALIAN Signior SARATTI, preſerved in authentick Writings: it is ſaid to have fallen near GENOA: but this is very difficult to be reconciled to what we know of the Courſe of Nature. We are ſenſible that Snow is no other than watery Matter, frozen in a particular Manner; and we know alſo that this Water is raiſed in Vapour by the Sun's Heat: now we are ſenſible from what we ſee in Diſtillations, and by various Experiments, that Vapours do not riſe coloured. The ſtrongeſt Tincture of Cochineal will yield a colourleſs Water, if diſtilled; and Red Port Wine yields a colourleſs Spirit. From theſe, and many other Conſiderations, there is Reaſon to imagine that there has been ſome Miſtake in what is written on theſe Subjects. We know that what have been called Showers of Blood, have been no more than common Rains falling in Places where there have been Multitudes of little red Inſects; and that what are called Showers of Frogs, have only been Rain, and have invited thoſe Creatures from their hiding Places. In the ſame Manner it is probable that this Snow was not red as it fell, but that it fell upon ſome red minute Inſects. Signior SARATTI ſays, that when ſqueezed it yielded a red Liquor, but this may be accounted for the ſame Way, for if the Inſects upon which it fell were ſqueezed among it, their Juices might turn the watery Part of the natural Snow red.

This may ſerve as an Account of the Nature of Snow, ſufficient for the Huſbandman's Purpoſes of Uſe, or even for his limited Curioſity.

We have obſerved that it is often advantageous to him, preſerving his Crop; but like all other the good Gifts of Nature, it may be hurtful in the Extremes. The ſame Rain that moiſtens the Earth, may drown its Products; the ſame Heat that calls forth the Shoots of Plants may, in a greater Degree, parch and deſtroy them; and in like Manner Snow, which ſhelters his Crop may, in a great Fall, ſmother his Cattle.

He is therefore to act in this Reſpect, juſt as in Regard of Hail. He muſt watch it as it comes, and obſerve whether it will be in the common Courſe, or Exceſſive and Violent. In common Falls of Snow he has nothing to do: but when he ſees a vaſt Quantity on the Ground, and more in the Air, let him drive in his Cattle, and preſerve them from the Danger of being overwhelmed and buried in it, as they often are in thoſe Hollows to which they fly for Shelter.

CHAP. XIV.

Of Winds.

WE have conducted the Huſbandman thro' the ſeveral accidental Attacks to which he may be ſubject from Drought and Rain, Hail and Snow. And we are now to conſider another Subject relating to the Elements, from which he may, without due Precaution, receive great Harm.

Winds are not of the Nature of Snow, a Benefit in the common Courſe to the Land: they are too frequently hurtful. Their general and great Purpoſe is to thin, cleanſe, and purify the Air; and as in this Office, ſo needful to Life, they will often be dangerous to the Huſbandman's Crops of various Kinds, and even to his Buildings, he muſt timely guard againſt them. Let him not accuſe Providence of thoſe Damages he may ſuffer through his own Neglect: God ſaw Winds neceſſary to keep the Air in due Condition, and he has given Man the Uſe of Reaſon to protect himſelf and what belongs to him from their Fury.

The Sea would putrify notwithſtanding all its Salt, if the Winds did not ſtir and move it about: freſh Waters, when they are large, would ſooner ſuffer the ſame Fate, and Men would be carried off by Peſtilences raiſed from the Vapours of ſuch corrupted Maſſes: all this is prevented by the timely Miniſtry of the Winds; and all their Force may be broken with Reſpect to the Farmer, by a proper Plantation of Trees. We know from what Quarters the moſt furious Winds blow, and the Defence is to be prepared thickeſt

thickeſt there. The Huſbandman is not to leave this Care till the Storm comes, but to prepare in Time, as one who expects it. Trees are of ſlow Growth, but when planted properly they are a very certain Defence.

Beſide this general Care there may be particular Cautions uſed, to prevent Damage on extraordinary Occaſions; and as Storms may generally be foreſeen, like other Changes in the Elements, theſe ſhould be prepared according to the Neceſſity. We ſhall give the Huſbandman a general Idea of the Nature of Winds, and of his proper Defence againſt them; and afterwards add thoſe Signs by which particular Storms may be known to be approaching, and the beſt Care of the Products of the Ground againſt them.

Wind is no other than Air in Motion.

We are ſenſible there is ſuch a Thing as Air, by the Changes we perceive in it, but as it is too fine a Subſtance to be the Object of our Sight or Touch, we only perceive it in the Winds, feeling it by its Motion; whereas, when ſtill it is not perceptible to any of our Senſes, though manifeſt to our Reaſon.

We in this Iſland are ſubject to great Variations and Changes of Wind, from its different Direction and Degree of Strength; but this is not the Caſe throughout the whole World. Between the two Tropicks there is a conſtant and unchangeable Wind, that all the Year blows from Eaſt to Weſt. This Sailors well underſtand, and it is called the general Trade Wind.

About the Coaſts of the Ocean there are conſtant and regular Winds alſo, at certain Times of the Day. Theſe are called Sea Breezes. They blow regularly every Evening from the Sea to the Land; and every Morning from the Land to the Sea.

In many Parts of the World there are alſo regular periodical Winds. Theſe blow one half of the Year one Way, and the other half of the Year the other, without any Variation.

In our Iſlands the Winds play about with great Uncertainty; but in general, where there is nothing in particular to diſturb them, North Winds are moſt frequent in a Morning, Weſt at Noon, and South at Night.

The Winds blowing from off the Sea are naturally moiſt, becauſe they take with them a great Quantity of thoſe Vapours which the Sun conſtantly exhales from the Surface of that vaſt Body of Water. Theſe Winds, when they are gentle, bring only a fine pure watery Vapour; but when the Surface of the Ocean is ruffled by them in Storms, they frequently carry off a Part of the abſolute Salt Water in ſmall Particles. This, when it is carried on Land, is called the Spray of the Sea. It is often very deſtructive, and it will be carried many Miles.

This is mentioned as a practical Caution for the Farmer. Many of his Crops will be injured greatly by this Accident, therefore it is his Buſineſs to plant by Way of Defence; and keep a good Hedge every Way to the Seaward.

The North Winds in England are cold, and the Southerly Winds warm. A Fall of Snow will have Power to change the Courſe and Current of our Winds. A warm Southerly Wind ſhall often be changed into a cold Northerly one by this or by a Shower of Hail. It would be natural to ſuppoſe the Wind changed, and brought the Hail or Snow with it; but Philoſophers, who have examined deeply into thoſe Matters, and particularly that great Chriſtian Philoſopher Dr. Derham, ſhews it to be otherwiſe, and that the Snow or Hail abſolutely change the Courſe of the Wind.

The ſtrongeſt and coldeſt Winds with us comeing from the North and North Eaſt Quarters, it is againſt theſe the greateſt Caution is to be had in planting.

We have given a large Account of the Nature of Trees, and the Manner of planting them, in a preceding Part of this Work, and to that we refer the Reader for his Choice of the various Kinds. The Sycamore has been happily experienced in the Neighbourhood of the Sea, where it thrives very well; and on expoſed Situations the Yew is excellent. It will bear the Expoſure, and delights in the hard dry Soil uſually found in thoſe Places. And though its Growth be ſlow, its Strength makes Amends. Its Branches alſo ſpread excellently for Defence, and are covered with their Leaves all Winter, the Time when Shelter is moſt wanted, and when Trees in general are leaſt capable of giveing it.

After the Yew we may very well name the Elm for this Service; it roots firmly, and is full of Branches. Its Growth is not ſlow, and it is nearly univerſal, for there are few Soils on which it will not thrive.

Hedges are the ſame Security to Fields that Trees are to the Farmer's Dwelling; and the more he ſtands expoſed to Winds the more he is to guard againſt them, by a due Care in this Article.

In Trees planted for this Purpoſe of Shelter to a Houſe, there ſhould be a particular Method of cutting. The Elm will grow to any Form the Planter pleaſes, and indeed ſo will moſt other Kinds. In this particular Service, their Uſe, and the Intent of the Plantation, ſhould be conſidered, as alſo their own Danger. When the Building is much expoſed to Winds, ſo muſt the Trees be that are ſet to ſhelter it: therefore let them be ſo cut as to be leaſt liable to Danger. The Head is the Part over which the Wind has moſt Power, and it is of leaſt Service in ſheltering the Dwelling: therefore in theſe Caſes let the Head be ſmall, and the Tree encouraged to ſhoot out into Branches. The thicker they ſtand the more is the Shelter, and the leſs they are in Danger of being torn down.

When the Huſbandman has taken Care his Dwelling be thus well defended, let him conſider what Part of his Crops will be moſt expoſed to Danger from this Cauſe, and at what Times; and then conſider of the Ways to foreſee and prevent the Miſchief.

CHAP.

CHAP. XV.

Of the Signs by which Winds may be foreknown.

THERE are fewer Preſages and Notices of Wind, than of Rain or Drought; and they are to be obtained from fewer Objects: but therefore the Huſbandman, who wiſhes to preſerve his Crops from all Accidents, ſhould be the more careful in looking after theſe.

If there be a red duſky Sky in the Morning, and the Sun riſes in it white and deadiſh, the Farmer may expect that Day violent Guſts of Wind; and generally there will be ſome Rain with them.

When the Sun is pale at Setting, and goes down behind a thick dead-looking Cloud, there commonly follows Rain that Night; and in that Caſe there is uſually a ſtrong and diſorderly Wind the next Day.

If the Moon look dim and miſty, and have a large hazy white Circle about her, the next Day will be generally much ruffled by Winds.

When the Moon looks particularly bright, but has about her two or three broken Circles, it is a very ſtrong Sign of a Storm.

When the Stars appear more numerous in the Heavens than uſual, and have a particularly lively Luſtre, it foretells a Storm. This as well as the laſt Obſervation regards violent Winds, more than thoſe light Blaſts of ſhort Continuance which are often preſaged by the others.

At any Time when there are a Number of ſmall black Clouds ſcattered in the Heavens, and they move to and fro in a diſorderly Manner, ſtrong and unſettled Guſts of Wind may be expected: theſe are the Winds that do moſt Harm of all to many of the Products of Huſbandry, and therefore the greateſt Regard ſhould be had to this Signal, which gives Notice of their coming, and every Precaution taken in Time againſt them.

When there is a Rainbow, let the Farmer look carefully upon it; not only with Reſpect to thoſe Signs of Rain which we have directed him to underſtand from it, but on this other Occaſion of Wind alſo.

When the Rainbow is thicker than ordinary, it is a Sign of Guſts and Blaſts. When there is a great deal of Red in it, and that is very fiery, it betokens violent Storms.

The Rainbow is naturally a continued Thing; but ſometimes we ſee it interrupted in its Courſe, broken, and as it were ſeparated into many Parts: this is always a Signal of Winds. Moſt of theſe Signs that are perceived in the Rainbow, foreſhew Winds attended with Rain; but that is not conſtant and certain.

Among Animals fewer Notices of Winds are perceived, than of other Changes in the Elements; yet we are not wholly without Notices from them. About the Sea Coaſts in particular, a great deal may be gathered by thoſe Birds which live partly on the Water and partly at Land. The more ſerene the Air, the farther they keep out at Sea. When they ſuddenly make to the Shore together, there is certainly a haſty and violent Storm approaching: and when they keep about the Shore, and will not venture into open Sea, there will certainly be ſtrong Winds that Day.

There is in ſome Places a ſmall Bird, which from its Apprehenſion of Storms they call the *Storm Bird*: this has ſuch certain Knowledge, and ſuch Dread of a Storm, that it never fails to make immediately to the Shore when it is near, on the Approach of Danger; but at open Sea it follows Ships, giving Token to the Sailors of many an unexpected Storm. The Guidances theſe Creatures receive from Inſtinct are very ſurpriſing, and they were intended by Providence not only to be uſeful to themſelves, but to Mankind in obſerving them. This little Bird ſeeks the Shore, when in Reach, before the Approach of a Storm: and when too far from Land, it gets behind a Veſſel for Shelter. The Sailors well know they have a Gale to expect when they ſee it; and the Farmer ſhould have the ſame timely Caution to prepare for the Defence of his Crops in Danger.

CHAP. XVI.

Of the Damages done by Winds to Huſbandmen in their Crops.

PLANTS may receive Injury from Winds at different Periods of their Growth: while young they are ſo tender, that the Blaſt will often chill or ſhrivel them up: when more advanced in Growth, they are more open to its Force by their larger Bulk; and by their ſtanding higher: at this Time they require to be very well faſtened in the Earth by their Roots; and the moſt natural Effect of all others from the Wind is the rocking them about, and looſening of them. This is a Circumſtance very little regarded by Huſbandmen, tho' very much by Gardeners. In this, as in many of the preceding Inſtances, there will be the greateſt Advantage in bringing the Practice of the Garden into the Field. In new planted Trees the Cuſtom is to tie them up to Stakes: and the Stalks of flowering Plants that riſe to any conſiderable Height, are in the ſame Manner faſtened to Sticks. This is of the greateſt Service in both Caſes; preſerving the Roots quiet and ſteady in the Earth. We would not have the Farmer follow this Practice literally, by tying up his Corn or other ſuch Growth, but we would have him take the Caution with him of the Danger there is from Winds, though he uſe another Method of preventing it.

His great Care in moſt Reſpects, muſt be employed in getting ſtrong and thick Fences: in particular Crops there muſt be particular Cautions, which we ſhall name.

Of all the Huſbandman's Products, there is none which ſo often receives Damage by Wind as Hops. There are two Seaſons at which they are deſtructive to this Plant: the Blaſts of the Spring nipping their Buds, and the Storms of the more advanced Part of Summer ſhaking them at the Root.

With Reſpect to the nipping Winds of the Spring, as the Plants are at that Time not much advanced in Height, they are eaſily enough ſheltered by a good high Pale, or a very cloſe Hedge. With Regard to the Winds afterward rocking them at the Root, the firſt Defence is to chuſe a ſheltered Place for the Ground; or plant ſome tall Trees that may ſhelter it: and for all ſucceeding Time the grand Security of the Plants is the fixing the Poles deeply and firmly in the Ground.

Corn is in the ſame Manner expoſed to Damage from Winds, not only when in the Ear by lodging, which principally happens from Winds and Rain together, but while in the firſt Shoots; for the ſharp Winds ſometimes deſtroy in a Manner the whole Produce at this early Period. Experience ſhews, that it is in open Fields the Crop is moſt liable to this Miſchief; and Reaſon therefore ſpeaks, that the ſame Remedy will preſerve it in both States: this is a good Encloſure. Different Soils require different Kinds of Shrubs for Hedges; and we have in a preceding Part of this Work, given the Farmer his Choice of a vaſt Variety of Kinds for this needful Purpoſe; indeed ſo many, that there is not any poſſible Diſadvantage to which his Land can be expoſed in this Reſpect, which has not in Nature its Remedy under this Article, and which we have not endeavoured to lay before him.

When a Plantation of one Kind does not ſucceed for this Purpoſe, it will be very proper that he try another; and when he is doubtful of the Kind that may be beſt, it will always be right to plant two. Moſt of the Hedge Shrubs that we have recommended, will grow as well two together as ſingly; and in this Caſe if one ſucceed, it will anſwer the Purpoſe; and if both, ſo much the better.

When there is Danger of a common Plantation not ſucceeding, from the Dryneſs and Barrenneſs of the Ground, it is always a good Caution to ſow Furze on the Side of the Bank. If the Hedge ſucceed perfectly well, this may be pulled up; but it rarely does ſo well but that a Bottom of this buſhy Plant may be an Advantage. The Winds that nip the Winter Corn in the Blade, get in more at the Hedge Bottoms than elſewhere; and nothing better than this fence againſt them.

Theſe are Accidents the Farmer is always to be aware of, and therefore the Preparation ſhould be made every where; and every Field will fare the better for it.

CHAP. XVII.

Of the Nature of Blights.

HAVING laid before the conſiderate Huſbandman ſuch an Explanation of the Effects of Changes in the Air, and of the Means of guarding againſt them, as we hope may ſerve in general Circumſtances for the Preſervation of his Cattle and his ſeveral Growths, we come now to conſider the particular Accidents to which each Kind are liable: and in the firſt Place thoſe which affect his Crops.

The firſt of theſe, as the moſt hurtful, is that which is very commonly known, but very little underſtood, the Blight. We ſpeak of it familiarly, becauſe it is common: but among the many Things that have been conjectured as to its Origin, very little ſaid has any Foundation in Fact.

It is a common Error in theſe Reſearches, to take thoſe Things for Cauſes which are only Effects: and nothing ſo much perplexes the Attempt to Knowledge.

As we have proceeded on other Occaſions we ſhall on this: we ſhall ſuppoſe, that in order to the remedying an Evil, the firſt Step ſhould be to underſtand its true Nature and real Cauſe; and this we ſhall endeavour to follow in the preſent Inſtance.

Among the Variety of Thoughts that have been delivered to the Publick on this Head, the Huſbandman, whoſe laudable and uſeful Curioſity ſhould lead him to ſearch after the Cauſe of this Diſaſter, would not know which to adopt: we ſhall curſorily name to him the principal of thoſe which have been received at different Times, and point out what Experience joins with Reaſon to determine.

The Blight is a Diſorder that affects Trees and Plants, and is as terrible to the Gardener as the Farmer. It appears in various Forms according to the Degree, affecting ſometimes entire Plants, and ſometimes only Parts of them. It is the ſame Diſorder which the Vulgar call a Blaſt.

When it ſtrikes a tender Plant, ſometimes the whole periſhes; and in ſome Caſes, the whole Border of a Garden, or the whole Produce of a Field, is loſt at once. At other Times it ſtrikes only a Part. The Leaves of Trees often fall off by this Means, while the reſt is unhurt; and ſometimes the ſame happens to Plants of leſſer Growth. Sometimes the whole Quantity of the Leaves are attacked, and ſometimes only a Part of them. The Leaves that are tainted by this Accident, ſhrivel up and appear ſcorched; and the Part of the Tree or Plant which is thus ſtruck with it is covered with little Inſects.

This Diſorder is common to almoſt all Plants, and to all Parts of the World: we read of Blights wherever we read of Gardening or Huſbandry; and for more than two thouſand Years Men of Ingenuity have been gueſſing variouſly at the Cauſe.

The Greeks, who, according to Theophrastus, called it Erysibe, looked on it as a Stroke from Heaven; utterly incurable and incapable of Prevention. The Romans called it Robigo; and as they deify'd Plagues and Fevers, worſhipping every thing they feared, like modern Indians, their fanciful Imaginations found a Deity upon this Occaſion; they called the new-made God Robigus; and Varro ſolemnly invokes his Bleſſing, that Blights be kept from Trees and Corn.

In general it was attributed to the Eaſt Winds; but Virgil, whoſe Huſbandry if it were better underſtood would be more followed, with much more Reaſon lays the Cauſe of it to Want of Care and right Culture; and, inſtead of praying to an imaginary God, adviſes the Farmer to betake himſelf to his Labour. It was not Want of Piety in this Poet, that referred him to the Uſe of Labour rather than fooliſh Rites. In this Caſe he orders the Farmer to pray for ſeaſonable Showers; and 'tis only the Worſhip

of an imaginary Deity, the Creature of Fear and Folly, he derides.

The early Notion of attributing Blights to East Winds, has been continued to this Time; and the Curious seeing Insects in such Abundance on the Leaves and Branches that have been struck, suppose these East Winds brought the Eggs of those Insects, and that they are the Cause of the Distemper.

Others have attributed the Cause of Blights to drizling Showers freezing upon the tender Buds, and that Way destroying them: in both these Conjectures there is some Foundation; but they err contemptibly who attribute this Disaster to the Aspect of the Planets. The Accounts however given by those who maintain the other Opinions are of little Consequence, for they agree with only one Part of the Subject. They attempt to explain only the Blights of the Spring, for both the sharp cold Easterly Winds, of which they complain, are most peculiar to that Season; and the freezing of drizling Rains upon the Buds can happen at no other. But there are Blights, and those terrible ones, at Seasons of the Year very different from these. Corn is often blighted in its full Growth, in a wet Summer. Therefore this Accident may happen without Frosts, or without those very sharp and cold East Winds, which though they frequently attend it, we perceive by this are not the Occasion of the Accident.

In the same Manner those Blights which are called Fire Blasts, and are the most terrible of all to a Hop Ground, happen in JULY oftener than at any other Time.

CHAP. XVIII.

Of the antient and modern Observations of Blights.

THIS shews that the Cause is not what these Persons have thought, and therefore that the Farmer must seek farther than their Advice for a Remedy. The same Accident that happens in this Manner in our Hop Plantations, us'd to damage the Vineyards of old ITALY. The Authors on Country Affairs, name it with great Marks of Concern, they distinguish it by the Name of Carbunculus, but this we find both by the Context and their own Account of the Disaster, was the same with the Robigo or Blight. Storms, PLINY says, were less terrible to the Vintage than this Blast, for they affected only particular Places; this cut off whole Plantations.

The Time of this terrible Damage happening to the Vineyards, appears to have been the very same with that in our Hop Grounds, and the Circumstances also the same. Ours happens toward the End of JULY, and theirs come on toward the ripening of their Grapes. What we read particularly of it is; that it generally followed violent, sudden, and short Showers, which happened about Noon in that hot Season, and were followed by clear Sunshine. They add, that it was sometimes partial, sometimes universal: that when it was partial, 'twas the Middle of all the Vineyards that suffered, and when it extended through the whole Ground, it always was plainly perceived to have begun in the inner Parts, and there to have been most severe.

This is the Account of a violent Blight in the Heat of Summer, in the Vineyards of ITALY, two thousand Years ago; and if we compare with this the exact and judicious Observations of Doctor HALES, made upon our ENGLISH Summer Blights in Hop Grounds, We shall see the antient * and the modern † very happily explain and illustrate one another: and the Farmer will thus, better than any other Way, be led toward the Discovery of the real Cause of the Disaster.

* *Columella de Re Rust.*
† *Hale's vegetable Staticks.*

No Plantation can so much resemble that of the antient Vineyard, as our modern KENTISH Hop Grounds: the Season for their Carbunculus is the same with that of our Fire Blasts, and the Circumstances attending both perfectly correspond. The Observations of our ENGLISH Philosopher are, that when there has been Rain, and a hot Gleam of Sunshine immediately followed it, the Fire Blast has happened: that it has attack'd the Plants in the Middle of the Hop Ground particularly, scorching them all up in a Manner from one End to the other.

The Damage in this Instance happened a little before Noon; and the Blight or Fire Blast ran in a Line at right Angles with the Sun Beams at that Time of the Day. There was little Wind; and that which did blow was in the Course of the Blight, or according to its Line. Those who would enquire into the Nature and Cause of these Disorders in Plants, are extreamly obliged to the Author of these punctual Observations; for comparing them with what we find in these old Authors, we find that the Nature of Blights is a fixed and certain Thing; that they appear in the same Manner, and observe the same Course, and that they plainly arise from the same Cause in the most remote Parts of the World.

This shews their Origin to be always, and every-where, from the same Principle; and it is not impossible upon so much Observation, to make a probable Conjecture what it is, and thence to attempt a regular Method of preventing its Damage or defending Plants and Trees from it.

This we shall endeavour to trace and direct in the most punctual Manner.

CHAP. XIX.

Of the real Cause and Origin of Blights.

BEFORE we enter on this Enquiry into the Cause of Blights, we must warn the Husbandman that he distinctly understand what is signified by that Name. We have mentioned the Circumstances and Manner of Appearance of Blights, and these, according to those Circumstances, we are about to account for; but we must remind him that many, for want of Consideration, confound together under this Name almost

almoſt all the Diſorders to which Plants and Trees are liable.

A Blight, diſtinctly and properly ſo called, is a Damage ſuddenly happening to Trees and Plants, which appears in the Manner of burning, ſcorching, or ſhrivelling up the Leaves, and often withering the young Branches. This we have ſhewn happens ſometimes in Spring, ſometimes in Summer; and this is what is properly called by the preſent Name: if any call a Growth of whatever Kind blighted, becauſe it is ſtarved, or diſtinguiſh by that Name the Damage done by Froſts upon too early Bloſſoms, they are to be told theſe Diſorders of Plants and Trees come under the Heads of Accidents from Froſt, and Accidents from want of Nouriſhment, and will be treated of diſtinctly as ſuch. Therefore what is here mentioned under the Article Blight is a diſtinct Thing, and it is of the Cauſe of that alone we treat in this Chapter.

This Blight ſometimes affects a whole Plantation, or at leaſt the whole internal Part of it, and ſometimes only here and there a ſingle Plant. In the firſt Caſe, which is of the greateſt Conſequence, it depends in ſome Meaſure on the Nature of the Plantation, and therefore may be remedied or prevented; in the other it ariſes from Cauſes quite out of our Power, and we cannot do any thing to obviate the Miſchief; but it is of the leſs Importance, becauſe it affects but a ſmall Part of the Crop.

The Blight which we have deſcribed as affecting the inner Parts of Hop Plantations, and which the Antients mention as deſtroying their Vines, will alſo deſtroy whole Crops of various Kinds in the Field: we ſhall ſee the Cauſe of this, and therefore may reaſonably propoſe a Remedy.

As it affects the inner Parts of Plantations firſt and moſt, and as it follows Rain, there is all poſſible Reaſon to believe it is the Effect of a Vapour raiſed in Abundance in thoſe Places, and ſtagnating there; on which the Sunſhine operates to the Deſtruction of the Plants.

If this ſhall appear upon farther Enquiry to be the true Cauſe of Blights, the Remedy will follow plainly. It conſiſts in nothing more than keeping the Plantations clearer: ſetting the ſeveral Plants at greater Diſtances, and giving the Air free Way between them.

If the Outſides of the Hop Plantation eſcape, while the inner Parts are deſtroyed, what is the Cauſe of this, but that the free Air coming to the Outſides diſpels and ſcatters that Vapour, which ſtagnates in the cloſe Parts of the Ground, till the Sun, by its Means deſtroys the Plants. This plainly is the Caſe, and there is no other, nor can Reaſon propoſe, or will Experience vouch for any other Courſe. Therefore the Remedy will be to make the Plantations more open and free to the purifying Air. Moderation is to be uſed in this.

We know that Hop Grounds muſt be ſheltered from high Winds, or all will be deſtroyed; but at the ſame Time that they are ſheltered from the worſt Quarters, they may be left open on ſome others; though they are to be defended, they are not to be ſmothered up. This is the Effect of over Caution in weak Minds, but nothing is more dangerous. Let the Farmer in this Caſe, and all others, take Care that he avoid the common Miſtake of running into one Fault in ſhunning another; it is in this Caſe, as in many others, running into a worſe.

When the Ground is ſo diſpoſed that the Air can have free Ingreſs to all Parts of it, there will be nothing to fear from the Fire Blaſts of Summer. What is obſerved of the Hop Ground in this Caſe, holds good of all other Plantations: I only name that here becauſe this is the moſt particular, and in which it is moſt plainly ſhewn.

The Way to give the Air this free Ingreſs and Paſſage, is to place the Hills at greater Diſtances than uſual. We have laid down the beſt Diſtance in general Inſtances treating on Hops; but let the Farmer obſerve, that in Caſes where the whole Ground is more encloſed, the Paſſages within muſt be opener.

Too cloſe planting is moſt of all deſtructive to Hops, by bringing in theſe Blights, and Fire Blaſts, becauſe the Hop is ſo tall and large a Plant: but in all others it more or leſs affects them in this Caſe, according to their Height and Manner of Growth, and according to the Expoſure of their Situation.

The Summer Blights of Corn, and all other Crops, are owing to this ſame Cauſe, the Plants ſtanding too cloſe; in this Caſe the hot Sunſhine following large Showers, blights whole Fields.

The Caution to be given the Farmer is, that he plant all his Crops thinner than the uſual Cuſtom; and this we have recommended to him already, and have ſhewn him that his Produce will not be leſs, but greater for it. As this muſt be his general Caution, ſo in particular he muſt obſerve, that where the Place is moſt cloſe the Diſtance of the Plants muſt be the greateſt.

This Caution recommends the Horſehoeing Huſbandry as a Cure for Blights, and indeed there is none ſo certain or ſo great. Who ever ſaw a Field of any Crop treated in this Manner, blighted: 'tis not only the clearing the Ground between the Plants, that gives them this Advantage in the Horſehoeing Huaſbndry, but the affording them more Nouriſhment, that helps greatly. Starving and blighting are two diſtinct Things; but a ſtarved Plant will be ſooner blighted than one that is ſtrong and flouriſhing.

The Huſbandmen of old Time were aware of this; for Virgil preſcribes but one Remedy, which is Labour. Indeed this is one great Reaſon for our recommending the new Practice of planting at Diſtances, and breaking the Ground between for almoſt all Crops. The Plants are by this ſupplied with abundant Nouriſhment: no Weeds riſe to ſtarve them; and they cannot ſtarve one another; and the Seaſons and Elements are admitted to their Good, but can do them no Harm. The Showers are imbibed by this free and broken Earth between them, better than any other Way, and what is evaporated has the open Air to expatiate in, and goes off blended with it.

If we would be aſſured of the Truth of what is here advanced, reſpecting the Cauſe of Blights, our Eyes may be made Evidences. Let any Man look into a Hop Ground on a Sunſhining Day,

Day, after great Showers. In the Middle of the Ground, and every where when the Plants ſtand thick and cloſe, he will perceive theſe Vapours riſing in Abundance, and hanging with a quivering Motion among them like a light Smoak, where there is no Wind: if he look at the reſt of the Plantation, through them it appears dim and hazy; and if he look through them at a Church or Houſe, or other diſtant Object, his Eyes will ake by Reaſon of the confuſed Look and quivering Motion. Let him then examine whether there be theſe Vapours about the Outſides of the Ground, and he will find there are not. All is there clear, becauſe the Acceſs of the Air is free, and they blend among it as they riſe. The Blights and Fire Blaſts follow in the Middle and cloſe Parts of the Ground, and not on the Edges or among the outſide Plants. They come where theſe Vapours have been ſeen hanging; and no where elſe. There is this to cauſe them, and there is nothing elſe. Therefore in all Reaſon we muſt conclude theſe Vapours are the Cauſe, and no other.

We ſee the Occaſion, and the Remedy is eaſy. Let the Air have free Egreſs as well as Ingreſs among all Parts of the Crop, whether it be of a taller or lower Kind; and no Blights will be found. This is beſt obtained by following the Practice of the Horſehoeing Huſbandry, but any other Method of keeping the Plants at a Diſtance, and allowing the Air free Paſſage between them, will anſwer the Purpoſe.

Thoſe particular Blights which fall upon only a ſingle Plant in a Field, or any Part of a Plant or Tree, ariſe plainly from the ſame Cauſe with theſe general and terrible ones we have deſcribed already. Their Origin is an undiſſipated Vapour. If it be aſked, whether little Parcels of ſuch Vapours ever hang about in the Air, thoſe who are accuſtomed to the Uſe of Teleſcopes, can tell us that they do. 'Tis not eaſy to diſtinguiſh ſuch floating little Parcels of Vapour by the naked Eye, but when thoſe curious Perſons uſe theſe Glaſſes, they often ſee them come acroſs their View and diſturb the Sight.

One Thing that confirms the Opinion of theſe particular and partial Blights happening from ſuch little Parcels of Vapours is, that they generally come when there is little or no Wind. A greater Wind would break and diſperſe them.

This ſeems to be the true Account of their Nature and Origin, they, like all other real Blights, are owing to Vapours hanging in the Air, through which the Sun's Rays ſcorch the Plants, and this is not wonderful to thoſe who underſtand what muſt be their Power on ſuch Occaſions.

CHAP. XX.

Of Damages by Eaſterly Winds.

WE have ſhewn what is the real Blight, and what the proper Method of guarding againſt it, and preventing its great Damage; we are here to treat of all the Accidents to which Crops are liable, and ſhall therefore begin with ſuch as are called by this Name.

There are Spring Blights of the ſame Nature and the ſame Origin with thoſe of Summer; the Effect of ſcorching Vapours kept ſtagnating in the Air, and heated by the Sun. Theſe are to be prevented in the ſame Manner as the others; therefore nothing more need be ſaid of them here: but beſide theſe there are two Kinds of Damage done by Eaſterly Winds; and by late Froſts, which, though called by this Name; are in themſelves altogether diſtinct in Nature, theſe we ſhall conſider ſeparately in this Place. Eaſterly Winds in Spring often knip and deſtroy the tender Shoots of Plants of all Kinds; and they do this Miſchief by ſtopping the Current of the Juices in theſe young and tender Parts.

The Farmer ſees this, and ſo does the Gardener, for both are equally affected by it, but neither of them underſtand or indeed look into the Cauſe.

When the Juices are thus ſtop'd they ſwell the young Fibres, and the ſeveral Parts of the Leaves burſt and wither. The Juices guſh out in this Caſe, and they become the Food of numerous little Inſects. Wherever there is Food for theſe Creatures, Nature yields them in great Number to devour it; and conſequently in this Caſe there are preſently ſeen Abundance of them on the young decaying Shoots.

Theſe Inſects are always found upon theſe damaged Branches, and by a very natural Error they are ſuppoſed to occaſion the Miſchief. The Farmer imagines the Eaſt Wind brought their Eggs, and he ſtrews Tobacco Duſt over the Crop, or burns wet Straw on the Side of the Ground, from whence the Wind will carry the Smoak among the Creatures. In this he aims to deſtroy the Inſects, as if that would recover his Crop: but he errs from the Beginning. The firſt Step ſhould have been to guard againſt the Miſchief, and when that has been omitted every following Care is vain.

The Eaſt Wind does not bring theſe Inſects, nor are they the Occaſion of the Miſchief: they hatch where there is Food, the whole Air being full of the Eggs of ſuch Creatures, and they feed upon the Juices which theſe blaſting Winds have ſtopped in their Current. Theſe harmleſs Creatures do not eat the Leaves, or tear them; they find them burſt, and they feed upon what runs from their Wounds.

The Farmer may know when there is Danger from theſe Winds, their Effect is by abſolute drying and ſhrivelling up the Parts, and the Deſtruction they occaſion is ſolely brought on that Way. We know the Effect a drying Wind will have upon any tender Leaf expoſed to it, when taken from the Tree or Plant: theſe young Shoots are thus tender while they are upon the Branches, and the Effect is the ſame. The Wind ſhrivels them up. When there are moderate Showers now and then, or when there are but good Morning Dews, theſe Eaſtern Blaſts do no Harm. The only Seaſons when they are deſtructive is ſuch as are perfectly dry. Therefore the Farmer knows when he is to fear the Damage.

When he ſees a dry Spring, and the Wind ſet in Eaſterly, let him go over his Fields and his Orchard, and ſee what Part of his Crops are

forwardeſt, for they will be in moſt Danger. Let him not ſtay for the Appearance of Inſects, but prevent if poſſible the Effect of the Blaſts: and this is to be done by proper Defence and Shelter. The Uſe of thick Furze Buſhes may ſerve excellently for this Purpoſe; and they ſhould be ſtuck in the Ground in cloſe Rows, not only on the Side of the Field where this deſtructive Wind is likely to come in, but in different Places, at ſome Diſtance in the ſame Direction.

We ſee the Cauſe here is ſo different from that of a common Blight, that the Remedy is to be juſt of the oppoſite Kind: in that Caſe the Wind is to be admitted among the Plants by all Means; becauſe it will carry off thoſe Vapours which are the Occaſion of the Miſchief: and in this it is to be kept off as much as poſſible; becauſe it is itſelf the Cauſe of the Injury.

This may ſerve as an Inſtance of the Neceſſity there is of the Farmer's underſtanding the Cauſes and Nature of all thoſe Accidents that may befall his Crops. We ſee in the preſent Caſe, that by the improper confounding of two Things of contrary Cauſe and Nature, under the ſame Name of Blight, he might be led to practiſe that for a Remedy, which would be the very Cauſe of promoting and extending the Damage.

We have now inſtructed the Farmer to diſtinguiſh the Cauſe from the Effect; and having taken the proper Precautions in this Reſpect, we may lead him to conſider the other. When he has ſheltered a Crop that may be in Danger on this Occaſion, let him from time to time examine whether his Precaution have proved effectual. If in any Place he ſees his Plants hurt while they are free from Damage in others, let him thicken the Shelter againſt that Place; and then, having provided againſt the extending of the Damage from the original Cauſe, let him take care that it be not encreaſed by its natural Conſequences.

We have ſhewn the Inſects which appear on Plants nipped by eaſterly Winds, are not the Cauſe of that ſhrivelling and withering of their Parts, but they may very much contribute to the ſpreading of the Diſorder. Wherever they are firſt hatched they breed extreamly faſt; and that in a very particular Manner. They do not wait the ordinary Method of Copulation of both Sexes, but they are all Breeders: and the Young produced from them are full of others, which they diſcharge from time to time, and ſo on at leaſt for ſeveral Generations. This may appear ſtrange to many, and it is one of thoſe wonderful Proceſſes of Nature, in which for particular Purpoſes ſhe departs from her uſual Tract and Courſe. Mr. De Reaumur, of the Royal Academy of Sciences at Paris, the Ray or Sloane of France, had the Curioſity firſt to diſcover and trace this wonderful Procedure, and many have ſince obſerved it: any one may, for the Creatures are common enough; and if one of them, any one at random, be put into a little Box and kept alive, it will produce its Young; and any one of theſe Young taken out as ſoon as born, and kept in a ſeparate Box, will do the ſame; and its Young after it. The Experiment has been continued through five Generations. This may ſhew us how abundantly the Inſects on a nipp'd and injured Plant will encreaſe; and they will ſpread the Miſchief by wounding other Parts of it. An accidental Injury brings them to the Plant, but they are capable of doing a great deal themſelves. Having fed upon the Juices that iſſue out of the burſt Veſſels of the Leaves, they will pierce them in other Parts in Search of more: and thus the Plant will be full of Wounds. Out of all theſe the Juices will flow, and they will thicken and grow clammy in the Air: and this being the proper Food of theſe Creatures; not only their own numerous Brood will from time to time encreaſe the Miſchief, but this Quantity of new Food will occaſion the repeated hatching of more and more of the ſame Kind, brought in the Egg or Embrio as the firſt were in the Air.

For theſe Reaſons, when the Huſbandman has found what Part of his Crop has ſuffered by the dry Eaſt Winds, and has guarded againſt their farther Damage by improving the Shelter in that Place, let him ſet to work to prevent the ſpreading of the Miſchief already done by deſtroying the Inſects, and by ſpoiling their natural Food.

This is not to be done by ſprinkling Tobacco Duſt, or any ſuch Method; for that will only damage ſuch of the Juices as are already out, and the Conſequence will be, that the Creatures will neglect thoſe Parcels and wound the Plant in new Places for more. This ſhews that the natural Conſequence of uſing this Duſt by Way of Remedy, is the encreaſing the Diſorder; and ſo I have found it by Experience.

We have obſerved that dry Winds occaſion this Miſchief, and it is dry Weather that ſupports the Inſects which appear upon the hurt Plants. Of all the Methods that can be deviſed for their Deſtruction, none will be found ſo effectual as the drowning of them. The Plants ſhould be well watered every Day with a watering Pot, and this repeated conſtantly till natural Rains fall. It will, if not utterly and entirely remedy the Evil, yet certainly abate, perhaps totally ſtop its Progreſs.

We ſee conſtantly that Rains deſtroy theſe Creatures, and reſtore ſuch Parts of the Plants as are not utterly deſtroyed to their former Vigour.

Nothing can be ſo reaſonable, ſo prudent, or ſo proper, as to imitate this Relief of Nature by Art, and nothing will have ſo good Effect. This watering of the Plants will not only deſtroy many of the Inſects, but it will waſh off the ſweet Juice that hung on the Leaves, and would have brought more: and at the ſame Time that it is anſwering theſe excellent Purpoſes, it will be obviating the very Cauſe of any farther Injury from theſe Winds, by remedying the Dryneſs of the Seaſon.

The Plants ſuffer in their Shoots by theſe Winds, becauſe there is no Moiſture to prevent their ſhriveling up by them: and by this Means that Moiſture, ſo needful to the Ground, is given by the Hand of the Huſbandman, though it be with-held in the Clouds. The watering them all over anſwers this Purpoſe extremely for the Time when it is doing; but the good Effect is not limited to ſo ſhort a Continuance. The

Vapours riſing from the wetted Ground ſoften the Air, and the young Shoots and Leaves are kept in ſuch a Condition of Moiſture, as to reſiſt the Effect of parching Winds all the ſucceeding Day. Let our Farmer on this as on all other Occaſions be upon his Guard, that he do not, by an ill managed Application of the Remedy, hurt more than the Diſeaſe would have done. Let him remember, that watering in an Evening when the Nights may be froſty, as they frequently are at this Seaſon, may be the entire Deſtruction of his Crop. He muſt for this Reaſon be ſure to water and waſh his Plants only in a Morning, and he need not fear damaging them then; for the Dryneſs of the Seaſon will make this uſeful in every Reſpect. The whole Day coming after the watering, ſome will be taken in by the Plant, ſome evaporated; and the Quantity that remains in the Ground at Evening will not be enough to do the Plants any Damage by the Night's Froſt.

Thus many good Purpoſes will be anſwered at once by the Method we have directed; and it will not be impoſſible but that the damaged Part thus managed, may prove the very beſt Piece of the Ground.

CHAP. XXI.

Of Damages by late Froſts.

WE have ſhewn that one of the Accidents which happen in early Spring to the Crops of the Field and Garden, and which is improperly called a Blight, may be remedied by due Care: we come here to treat of another Damage of the ſame Seaſon, called in a confuſed Manner by the ſame Name, but altogether different in Nature. The unexperienced Eye is pleaſed to ſee the early Appearances of Spring in the Garden and in the Field; but the more judicious tremble for both. In our uncertain Climate, nothing is more ſubject to Deſtruction than an early Shoot: we have Froſts frequently very late in the Spring, and theſe nip and deſtroy all ſuch early Shoots. It is therefore our Happineſs, when the Seaſons are more regularly ſeparated from one another; when the Winter takes its Time, and the Spring begins late enough to continue uninterrupted.

When it has happened that a Crop of tenderer Kinds has ſhot briſkly from ſome early ſoft Weather, the ſevere Morning that follows nips the tender Leaves and they fall off, and not unfrequently the young Shoots with them: this is a Stoppage in the Growth that retards it vaſtly, and that is very difficultly recovered.

We ſee the Occaſion of this Damage, and the Conſequences; but nothing is ſo difficult as to propoſe a Remedy for it.

The Gardeners, whoſe Bloſſoms and young ſet Fruit are frequently injured by this Accident, have Recourſe to a Method of Prevention which encreaſes the Diſeaſe. They cover up the Trees with Mats, and thus indeed defend them from the preſent Froſts; but they make the Shoots by this Means ſo weak, that they are ſure to be deſtroyed by the next. If the Farmer could any Way imitate this Practice, it would be by ſcattering Straw or Haulm over ſome tender young Crop: but in this Caſe, without the utmoſt Care, more Damage would be done than Good. If he ever ſhould be tempted to follow this Practice, there is but one Way of doing it ſafely, and that is attended with a great deal of Trouble: he muſt have this Covering of his Plants ſcattered ſlightly on every Night, and removed every Morning; raking it together in ſeparate Heaps, from whence it muſt be thrown upon the Crop again in the Evening. If it were ſuffered to lie on all the Day, the Plants would be drawn up ſo weak, that like the Shoots of the Trees in the Garden, they would be ſure to be deſtroyed by the next Froſts.

Though we can fence off Winds, and waſh away Inſects, we cannot command the Temperature of the Air; nor is there any Way of defending our young Growths from it other than what is juſt named: but we have on all Occaſions warned our Huſbandman to be wiſe betimes; and in this Caſe more than in moſt others it is neceſſary.

Let him before he commits his Crop of whatever Kind to the Ground, conſider the Dangers to which it will be expoſed; the Methods that he ſhall have in his Power for guarding againſt them; and the Chance of the Advantage from early Growth; and of their Deſtruction or Eſcape. 'Tis thus he will be able to judge, and no otherwiſe, of what is the proper Method of acting.

Some of his Crops are required early, and to others it is of little Advantage: this we have before explained under the particular Articles; and let him well conſider it in this Caſe. The earlier he ſows, the earlier his Crop will riſe; and the ſooner in Spring it is up, the more it will be expoſed to this Danger. Let him run the Hazard; for none but ſuch as will, have a proportioned Benefit from their Forwardneſs: and with reſpect even of theſe, let him be moderate; for it is not being out of the Ground at an extreamly early Period that is ſo advantageous. The great Benefit ariſes from ſo contriving the Crops, that they will be in a Condition of Growth upon the earlieſt Setting in of proper Weather. This he can only know by Gueſs: but having formed the beſt Conjecture he can, let him ſow accordingly; and if when the Crop is up the Froſts threaten, let him defend it in the Manner we have juſt mentioned.

CHAP. XXII.

Of Damages from Weakneſs and Starving.

WE have obſerved that among the many Diſorders of Plants, comprehended under the Article of Blights, in the common Way of ſpeaking, one was that of Weakneſs in the Growth from ſome Accident, which ſtarved it.

The very ſame Effect which we ſee produced by a real Blight, we ſometimes alſo find attending this Accident; and the Account for it is very

very eaſy. In that Caſe a thick Vapour, by Means of a ſtrong Sun, has ſhrivelled the Leaves, and ſcorched the tender Stalks of a Plant: and in this a like Accident happens from the Want of Nouriſhment. Thoſe Parts neareſt the Root are beſt ſupplied with Juices, and therefore they are full, flouriſhing, and fine; while ſuch as are fartheſt off from that Source of Nouriſhment, wither when there is not enough to feed all alike.

'Tis the ſame in this Caſe as in the Human Body: when the Heart cannot drive the Blood through all Parts; thoſe fartheſt from it ſuffer firſt, the Hands and Feet have the Juices firſt ſtagnate in them; and in the ſame Courſe in the Plant the Tips of the Branches, and thoſe other Parts moſt remote from the Root are firſt affected in the Caſe of ſtarving.

We name this for the Farmer's ſtrict Obſervation; becauſe it will let him into the Nature of the Diſorder, without which it is impoſſible for him to find the proper Remedy. When he examines what is called a blighted Crop, let him look carefully to this: no Matter that Inſects crowd, and Leaves curl up; and that all the Signs of real blighting appear: if he perceives all the Tips of the Stalks and Branches affected; and few other Parts, he may be ſure the Diſorder is no Blight or Blaſt, but a Stagnation of the Juices in the Tips or Extremities of the Plant, for want of a freſh Supply to force them on in their natural Courſe.

Although there is not a Circulation of the Juices in Plants, as ſome have ſuppoſed, there is a continual Motion forward to the Ends of the Branches, where a great deal is diſcharged by Perſpiration: this we have ſhewn in a former Part of the Work. This Motion of the Juices is altogether neceſſary to the healthful State of the Plant; and whenever it ceaſes the Part in which it is kept becomes diſeaſed.

Knowing thus much of the Oeconomy of Nature, in the Management of Plants, we ſhall not find it ſtrange that this Stagnation of their Juices happens from ſtarving. When the whole is in a flouriſhing State, the Root takes in a great deal of Moiſture, which it ſends upward in a conſtant Motion, and this drives on the reſt. When there is not enough of this received, and the Plant is not vigorous enough to throw it upwards, this Motion grows faint. The Juices ſtagnate and ſtand ſtill in the extream Branches: and where they ſtagnate they always burſt the Veſſels by the Sun's Heat, and ſweat out.

This is the Signal of Nature to all the Inſect Tribe together. Their Eggs or Embrios are floating every-where in the Air; and wherever there is Food for them they ſtick and hatch into Life; and they breed abundantly. Theſe come therefore wherever there are corrupted Juices in Plants; and their Appearance is as natural from ſtarving as from ſcorching of the Plants: from this it has happened that both Accidents are called by the ſame Name by the Vulgar; but let the Huſbandman learn the Difference, becauſe they require altogether diſtinct Remedies.

When the Cauſe is ſeen to be a Defect of Nouriſhment, and not a ſcorching Vapour, the Remedy is natural, but it is not equally eaſy to be applied in all Caſes. The Farmer will here ſee another Inſtance of the Excellence of the Horſehoeing Huſbandry. This Sort of Blight, as it is called, may always be remedied preſently in that Method, becauſe it is in our Power at any Time to give the Plants a due Supply.

What cannot be done ſo well in the common Method, yet muſt be attempted in the beſt Manner in the Farmer's Power upon the ſame Principle.

It will rarely happen that a Crop raiſed in the new Huſbandry is ſubject to this Diſorder, but when it is the Remedy is to ſend in the Hoe Plow, and tear up the Ground to a good Depth between the Rows. This giving the Plant abundant new Nouriſhment, as we have ſhewn, the Diſeaſe is remedied at once. The whole Crop ſhoots ſtrongly; and the little Inſects, whoſe Food depends upon the ſtarved Condition of the Plant, drop and die off of themſelves.

This is the ſhort End of a ſtarved Condition from Neglect in the Horſehoeing Huſbandry, for be the Soil what it will, ſtarving can only be the Reſult of Neglect in that Method. The Earth being broken ſmall is ready to receive the Dews and Rains, which will waſh its new brought Nouriſhment into the Roots; and the Roots will be ſent out in vaſt Multitudes to receive it; for the Conſequence of this plowing near them is, that their Roots are all cut off at the Ends, as thoſe of a Plant new ſet by a Gardener, and they ſhoot out innumerable others in Conſequence. This we have ſhewn before to be the Fact, in numerous Inſtances, and remind the Farmer of it in this Place, that he may underſtand how perfect a Remedy is this Way in his Power.

When a Crop of ſome of the large growing Plants, for they are moſt ſubject to this Accident, are thus endangered by ſtarving in the common Courſe of Huſbandry; the Hand Hoe is all that can give them Aſſiſtance, and it muſt be immediately employed. There is in this Caſe no clear Interval for cutting deep into the Ground, but what Space there is between Plant and Plant, muſt be clip'd as well as it can at the Edges and Surface. This will have ſome Effect; and indeed, if wiſely and boldly employed, may have more than the Farmer will at firſt expect.

What has aſſiſted to the ſtarving of the Crop in this Caſe is, probably either a large Growth of Weeds among the Plants, or their ſtanding too cloſe to one another.

In the firſt Caſe this Hand Hoeing is a Remedy, becauſe all the Weeds of what Kind ſoever, will be cut up by it; at the ſame Time that it breaks the Ground between the Plants, and cuts ſome of their ſuperficial Roots. But let the Farmer not ſtop here, in this Caſe of ſtarving, moſt probably the Plants ſtanding too cloſe has been the Occaſion of it; or if not no Way is ſo ſure to recover one half, as to cut up the other. This will give the Hoers Leave to work more boldly, and give more Scope to their Strokes, that they can cut deeper: the Earth will be more broken, and the Air, Dews, and Rains better let in: the Wind will be able to blow freſh between the Plants alſo, and every thing will thus tend to their Recovery.

Let

Let not the Husbandman grudge the Part of his Crop that is to be destroyed. Darius did well to offer half his Kingdom; and it would have been happy for him if Alexander would have accepted it, and left him the Remainder. In this Case the Question is not whether the Farmer shall have half or all; but whether he shall have half or nothing. I have thus seen a Field of Coleseed saved to the Owner in Northamptonshire, when every body gave it up for lost; and I really believe it yielded him more Seed from the half, or less than half the Plants that remained, than it would have done from the whole, if they had gone on ever so well in his crowded Method of planting them. In this Case, as in some others that I have seen, I am strongly of Opinion, that a great Part of the Mischief happened from the sowing so thick, that the Plants choaked and starved one another: and it is certain, that there is no Remedy like thinning them to a proper Distance. When the Husbandman shall see the young Plantation we have directed for his Orchard decaying in the same Way, let him pursue the same Method of Relief as we have directed in Case of Crops, by the Horse-hoeing Method.

In the common Plantations he must dig round the Trees with a Spade, breaking the Earth well, and throwing it in carefully and lightly: but in our Method of planting distant for cultivating the Land between, let him bring in the Plough, let him bear very near the Roots of every Tree that is in this sickly Way, press the Plough deep, and make the Share, as Virgil says, shine from the Furrow. This will give new Nourishment and new Life to the Plantation; and thus in every other Article, where the Mischief plainly happens from a starv'd Condition, let him give the Crop a more abundant Nourishment, and make it shoot strongly. This done, he need not trouble himself about the Insects; for, as the Doctors say, when the Cause is taken away, the Effect ceases.

CHAP. XXIII.

Of the Nature of Mildew.

THE Farmers are imposed on in nothing more than the Names, Nature, and Causes of the several Accidents to which their Crops are liable: and while they are not rightly informed in this Respect, they can never attempt any thing rational for their Cure. They hear certain Words continually repeated as the Names of various Accidents; but those who speak, and those who write, confound them one with another: we shall shew them distinctly what each Name means; what each Disorder is; and what Remedies are in their Power. Nothing is more needful to the Husbandman than this Knowledge, and nothing is more wanting.

Some have asserted, that Blights and Mildew are the same Thing; but these err, for they neither are the same in their Nature or Consequences: neither are the same Remedies or Precautions proper; therefore this is a very hurtful Error.

Others differing from these too widely, in the Vehemence of exposing their Error fall into another of as bad Consequence. They say they are not at all alike in Cause, or in their Nature. This is palpably a great Mistake; for they are alike in some Respects, though they are not the same.

We shall endeavour to set the Husbandman right in this important Article; and in order to it shall refer him to what he sees in Nature, not what he may have hitherto read in Books. Indeed the first Step toward his arriving at the Truth, must be his understanding the Errors which have been delivered to him as the real Accounts of the Accident.

Nothing can set the common Class of Writers on this Subject in a meaner Light, than the observing in the present Instance how they have transcribed Mistakes, and copied unmeaning Words from one another.

Old Markham fetches Mildews from the Heavens. He attributes them to baleful Influences, and malignant Vapours of the Sky; which striking to the Earth alter its sweet and pleasant Nourishment, and change it into Bitterness and Rottenness; whereby the Corn is slain outright, or rendered withered, lean, and all unkindly *.

This Doctrine passed for current, till the succeeding Days of Worlidge, who searching nearer Home for the Disorders of his Crops, attributes this to a fat and moist Exhalation from the Flowers, and other Parts of the Vegetables, condensed by Cold in the upper Region of the Air, and thence falling upon Plants again †.

The Language of Markham is florid in his uncouth Way; and that of Worlidge is familiar enough. In general, the farther People in these Studies deviate from plain Language, the farther they depart from Utility: these are Writings meant to inform the Mind, not to please the Imagination. The Fields may laugh and sing in Prophecy, and Virgil may have Beauty in his *intereunt segetes* §, for his Georgicks are Poetry: but these are not the Expressions which should be used in laying down the practical Rules to the industrious Husbandman, and explaining their Uses.

Worlidge has delivered his plain, original Conjecture, and many have adopted it; for Markham's was the Error of his particular Age, and could not be well received in any other.

Industrious Mortimer has copied honest Worlidge, not his Thought only, but his Words ‖; not so much as attempting to reason or improve upon him. Worlidge, though not exactly right himself, yet laid a Foundation on which a little plain Sense and good Observation would have arrived at the whole Truth.

From Mortimer; Chomel translating this imperfect Account, * conferr'd a lasting Obligation (such were the Words) upon his Country: and from Chomel 'twas englished back again, under the Auspices of Bradley †.

Thus we see how many write, and how few think: how Error goes the Round of different Nations: that which was old in Britain, after it had appeared new in France, grew new again

* *Book 2. p. 81.*

† *Syst. Agriculturæ, p. 209.*

§ *Book 1.*

‖ *Art of Husbandry, b. 7. p. 303.*

* *Dict. Oeconomic.*

† *The same Work translated into English, Article Mildew.*

again at home, in the Tranſlation of that firſt Tranſlation. From theſe, unaltered, unimproved, and unamended, the Account made its Way into the Compilations of Chambers ‡ and of Miller ‖; and from them into the patched Productions of ſtill later Writers below Contempt.

‡ *Encyclopædia.* ‖ *Gardener's Dict. Article Mildew.*

This is what the Farmer meets with, if he have Curioſity to read for Information. This was the State of uſeful Knowledge in a Country famed for its Improvements during almoſt a Century. The firſt rational Advance he is to make toward Truth, is, by ſeeing the Errors and the Imperfections of theſe Accounts; and the next is, to read it in the Book of Nature.

CHAP. XXIV.

Of the real Cauſe of Mildew.

WE have ſhewn the Huſbandman that the firſt Accounts of Mildew were erroneous, and that the later have been all imperfect. It is not true that Mildews are ſent down from the Clouds; nor can they ever be underſtood by thoſe who join the Exhalations of the Earth and thoſe of Plants together for their Cauſe. Let the Farmer look out into his Fields, and when he ſees a ſettled Mildew on his Crop, he will find Inſects, juſt as in the Caſe of Blights, feeding upon a Honey-like Moiſture lodged on the Plants; and where it is but beginning, he will find this Moiſture tho' leſs thick, yet ſweet and clammy, covering the young Shoots, tho' the Inſects have not found it.

This ſhews him, that the Cauſe of Mildew is the hanging of a thick ſweet Moiſture on the Plants; here is his firſt Step to the true Knowledge of the Diſorder; the next is to enquire whence this Liquor comes, not from the Clouds or Skies, according to Markham; for only pure and ſimple Water can get thither, nor did any thing elſe ever deſcend from thence: neither can ſuch a Juice riſe from the Earth, as Worlidge fancies, for there is none ſuch there. Waters may be impregnated with Minerals, and their Virtues may riſe with them; but there can be nothing of the Honey-kind raiſed from thence. The Earth can ſend up nothing but what it has, let the Sun's Power be what it will; and it has not in it the ſweet Juice which occaſions this Accident.

To underſtand this rightly, let the Huſbandman perfectly inform himſelf what this ſweet Liquor is; it is but one Thing in whatſoever Form it appears. Whether it be ſolid or liquid it is the ſame Subſtance; and whether we ſee it in the Form of Honey from the Bees Stores, of Manna from the Aſh Trees, or of Sugar from the Reed.

We ſee there is ſuch a Subſtance in Nature, and but one ſuch; and, to underſtand this Diſorder which it cauſes, let us enquire whence it comes. It is not dropp'd down from the Heavens, nor drawn up by the Sun from the Ground; this we have ſhewn: there remains but one way it ſhould come, and therefore that muſt be the true Source of it. Since it is not originally in the Earth or Air, it muſt be produced in the Bodies of Plants; and that is its true Origin.

The Juices of the Earth are received into the Roots of Plants; and theſe, as we have ſhewn in a preceding Part of this Work, are only Water and the fine Part of Mould, and of Manure: Water alone will, to many Plants, anſwer the Purpoſe.

Of whatever Kind they be in any particular Inſtance, whether Water alone, or Water and pure Earth; or, laſtly, Water, Earth, and the fine Part of Manure, they have nothing of this ſweet Taſte, nor of the Honey or Sugar Nature. They are received into the Veſſels of the Plant, and there, by an Operation to be admired, not to be underſtood, they are converted partly into the ſolid Parts of the Herb, and partly into theſe ſweet Juices.

We know this is done, becauſe taſting theſe Subſtances firſt we find they are not of this Nature; and examining the Juice of the Plant afterwards, we find that is ſuch; but we cannot enter into the Secrets of Nature ſo far as to find how it is done. Let the Farmer, more humble than the Philoſopher, be ſenſible of this, and know where to ſtop his Enquiries. It is enough for all uſeful Purpoſes, that he knows this Juice is there, no Matter how it comes. This ſweet Juice of Plants is extracted by the Bees from their Flowers, in its own proper Form, and lodg'd in their Combs as Honey. From the Sugar-Cane, the Juice being boiled down, leaves it in Form of Sugar; nor is that peculiar to this one Plant: the Juice of the Maple-kind is, in ſome Parts, boiled to Sugar, in the ſame Manner; and that of the Birch, or any other Tree, or Plant, properly managed, may.

This Juice, which is thus ſeparated in the Flowers, or lodged in the Sap, may ſhew itſelf on the Outſides of the Leaves and Branches. It does this on the Oak in our Country, and is there called Honey-Dew; and in Italy, particularly in Calabria, it does the ſame on the Leaves and Branches of the Aſh, and is called Manna. This is the Circumſtance that comes neareſt to our preſent Purpoſe. In the Courſe of Nature this ſweet Liquor ſhould be kept among the Sap, except the little that is ſeparated in the Glands of Flowers; but we ſee that in theſe two Inſtances it will ſhew itſelf in a ſeparate Form on the Leaves.

It is not the Oak alone in our Kingdom that has this Honey-Dew upon its Leaves; nor is the Aſh the only kind that has it, in hotter Countries, in the ſhape of Manna. The Manna of Briancon in France, is gathered from the Larch Tree, and that of Persia from the Alhagi, yet theſe are both true and genuine Manna.

This Juice, which is thus contained in all Plants, may by Accident be brought out to the Surface, and being there diſlodged, it will ſhew itſelf firſt in a clammy Moiſture; and afterwards, according to the various Circumſtances, in a tough Matter like Honey, or in a dry and firm Subſtance, as Manna. Experiments have been made to prove that the French Manna did not come from the Clouds, but was the real ſweet Juice of the Plant, which perfectly ſettle this Queſtion. Boughs have been cut off clean

in the Manna-Seaſon, and the Manna has been found upon them ſome time after, tho' they had lain within Doors.

This, and many other Obſervations of a like Kind, ſhew that the ſweet thick Subſtance found on Plants, is not rais'd from the Earth, or dropp'd from the Sky, but is ſweated out by the Plant itſelf.

Trees can bear this better than tenderer Herbs, and to this is owing the Difference of its Effects, in not hurting the one Kind, and injuring greatly the other.

This ſweet Juice is the Cauſe of Mildew; and the Farmer knowing its Nature and Origin, will rationally be led to enquire into the Manner of its doing the Damage, and thence to the proper Remedies.

CHAP. XXV.

Of the Accidents which bring on Mildews.

THE Reader will ſee from this plain Account of the Cauſe of Mildew, what is the Difference between that and the Blight: we have ſhewn that it is occaſioned by a Condenſation of the Juice of the Plant within, and this from a Sweating of it out. 'Tis ſeen, therefore, that though not the ſame Diſorder, they are allied in their Nature; but as their Cauſes are different, ſo are their Methods of Cure.

The Cauſe of Blights is often a cold Wind; but the Occaſion of Mildew is frequently a hot Sun, and a perfectly ſtill Seaſon. This agrees very well with the rational Account of the Nature of theſe Accidents; for Cold is moſt likely to coagulate the Juices in the Veſſels, and Heat to draw them out of them.

The pooreſt and even weakeſt Trees and Plants are moſt ſubject to Blights, becauſe in them there is the leaſt Force of Nature to carry on the Motion of their Juices againſt the Effect of Cold; but, on the contrary, the richeſt and ſtrongeſt Plants are moſt ſubject to Mildew, becauſe they bear the richeſt and the moſt abundant Juices. From theſe Obſervations, conducted by a firſt eſtabliſhed Knowledge of the Principle and Cauſe of the Diſaſter, we ſee the Errors of the Conjectures made by others, and the unhappy Effects they have taken upon their Practice.

Where moſt Manure and moſt Tillage are uſed, the Plants will be richeſt: and where, with equal Tillage, there is more Manure, thoſe Plants will, in the natural Degree, be richer than where there is leſs. On this is founded the Obſervation, that where there has been moſt Dung uſed, the Crop is moſt ſubject to Mildew. But thoſe who have credited the Accounts heretofore given of this Accident, being occaſioned by Vapours from the Earth, have been led into a very erroneous Imagination by it: they have thought that the Vapours of the Dung cauſed the Mildew; whereas that Manure had indeed done nothing but its proper Office, and the Crop had fallen under this Misfortune from the great Richneſs the Plants received from it. Upon this Principle the Farmer will ſee that a good Quantity of Manure will defend a Crop from Blights; and tho' it makes the Plants more liable to Mildew, that may be guarded againſt by other Meaſures.

Let the Huſbandman keep in his Mind the diſtinct Nature of the Blight and Mildew, for this Reaſon: he ſees they require a different kind of Caution; and in ſtarving his Crop to prevent the one, he may run it into the Danger of the other.

There is at all Times a great Quantity of Moiſture exhaled from Trees and Plants, and the abundant Diſcharge of this, when there is not a due Supply, may occaſion both the Accidents of Blights and Mildew; the firſt in the Spring, the other in Summer. It is the Opinion of Dr. HALES, that when the Moiſture is exhaled from Trees, in a cold Spring, faſter than it is ſupplied from the Root, this occaſions that Blight in which we ſee the Bloſſoms and Leaves of Trees fall in Spring *: and, on the other Hand, when in the Heats of Summer the Quantity exhaled is vaſtly great, and the Plant is rich in theſe ſweet Juices, they may be exhaled when there is not a ſufficient Supply of the others; and this the more, the greater the Heat is, and the richer the Ground has been made by Manure.

* *Vegetable Staticks.* Vol. I. p. 368.

This is an Accident in the Courſe of Nature, which often happens without any Damage following it; but when the Weather is leſs favourable there is great Miſchief: this being the real Cauſe of Mildew.

In the Heat of the Day this ſweet Juice comes out; and while the Heat continues it is not much perceived. It muſt have been rendered thin, in order to its getting out of the Veſſels; and the Heat which effected that Change in it, keeps it in the ſame Condition, during the Time the Sun is above the Horizon.

At Sun-ſet this Juice would thicken from the cooler Temperature of the Air; but then the Dews cover the Surface of the Plant with Water; this blends with the thick Juice which lies on the Leaves, and waſhes it away.

Whatever has been once diſſolved in a watery Liquor, will readily diſſolve in it again; and as this thick ſweet Matter was originally mixed with the watery Juices in the Veſſels of the Plant, it naturally and readily will mix with the Dew, which is alſo watery. This is Philoſophy, and this is Truth: the plaineſt Words beſt convey Knowledge.

The Farmer ſees the natural and proper Courſe of Things, and in this there is no Accident. No Mildew is ſeen upon the Plant, tho' the Honey-Juice has been exſudated, becauſe it has been waſhed off again before it had Time to do Miſchief.

If it had lain longer, it would have ſpread itſelf over the Surface of the Plant, ſtopped up its Pores, and ſpoiled its Growth; and it would have invited Inſects to feed upon it, which would have ſpread the Miſchief farther, as we have ſeen in Blights.

When the thick Juice is thus quickly waſhed off the Plant, no Harm happens; when it lies longer, the Mildew follows; this is the Courſe of the Accident.

There are Nights in which there is very little

tle Dew; and, in this Caſe, as the thick Juice will remain on the Leaves, there is the Foundation laid for the Diſorder: but there are yet many Chances for the Crops eſcaping. If a Shower of Rain falls the next Day, it will waſh away all, and there can be no Miſchief to the Plants: if this do not happen, there is the Chance of another Night of Dew, and this will ſtill take Place. Even a third Night's Help from Dew, after two dry ones, will anſwer the Purpoſe if there be a briſk Wind in the Morning; but if otherwiſe there commonly comes on the Damage.

A Wind at any Time, whether after Rain or after Dew, is of the greateſt Service againſt this Diſorder; and it is for this Reaſon Corn, in open Fields, eſcapes this Danger more than in Encloſures.

Every Article of Improvement has its Diſadvantages, which muſt be guarded againſt, otherwiſe they may counterbalance the Benefit. Thus in the preſent Inſtance, the encloſing Land, and enriching it with Manure, both make the Crop the more liable to this Accident of Mildew, but they defend it from many others, and encreaſe the Product ſevenfold. Therefore the Buſineſs of the Huſbandman is to guard againſt the Damage attending theſe Improvements, while he reaps their Benefit.

He will now underſtand perfectly the two fundamental Points, 1. What is the Cauſe of Mildew; and 2. What are the Accidents that bring it on. He will therefore have a rational Foundation for his Practice in guarding againſt the Diſorder, and in endeavouring to remedy it when it ſhall fall upon his Crops in ſpite of all his Caution.

CHAP. XXVI.

Of the Prevention of Mildew.

WHEN the Huſbandman's Land is rich, and his Crop ſtrong, let him be upon his Guard to perceive this Accident if it happen, that it may not be gone too far before he attempt a Remedy.

Let him provide againſt it by making his Encloſures larger for Corn Land than for Paſture; and by leaving Openings at certain Diſtances, at the Height of about five Foot.

This is a new Practice we are ſenſible, but it is of the greateſt Importance. It may prevent half the Miſchiefs that happen to Crops in encloſed Ground.

We have ſhewn, in ſpeaking of Blights, the great Neceſſity there is of the Air having a free Paſſage among Plants of every Kind; and this is always more or leſs obſtructed by Encloſures. The Winds that hurt a young Crop come in only from certain Quarters, theſe therefore may be defended thicker than the others; and this high Opening in other Places will give all the Advantage of Winds without their Damage.

When this is done there will be much leſs Danger of Mildew than on other Occaſions, but as it will happen ſometimes in open Fields as well as Encloſures, 'tis plain this can be no abſolute Remedy.

When the Days are hot, and there is little Wind, and the Nights are without Dew, then the Farmer is to watch for Fear of being ſurpriſed by Mildews. On examining he will find when the Miſchief begins, and he will perceive this thick Juice ſticking to the Stalks, Leaves, and young Ears of his Corn. It will diſcolour them, and he will find it firſt by his Eye from that Circumſtance, and then by the Touch, for it will ſtick to his Fingers. The Conſequence of this is, that the Crop withers; the Veſſels that ſhould take in Moiſture from the Air, as well as throw out the abundant Juices of the Plant, are ſtop'd up, and the proper Courſe of Nature is obſtructed. We have explained in a preceding Chapter, in what Manner Trees and Plants are kept in a healthful State, and this free Paſſage of their Leaves, and the reſt of their Surface, is a vaſt Article in their Oeconomy. The Top of the Corn Plant uſually ſuffers moſt by Mildew, and if it remain any Time, though it ſhould afterwards go off, yet the Corn in the Ear never ripens kindly, but is lean and poor, and however the uſeleſs Part of the Plant thrives, the Ear will be light.

It is of Conſequence to the Farmer to know when this Accident happens, for this Reaſon; becauſe whatever Remedy is in his Power muſt be applied in Time, otherwiſe the Miſchief will remain even after the apparent Cauſe is removed.

With Reſpect to the other Means of Prevention they are few, and not very certain of Succeſs; however, as they can be attended with no Damage, it will be right to try them.

The Fields being known where Mildews are moſt likely to happen, there muſt be Caution uſed accordingly.

As Wheat is more ſubject to Mildew in theſe Places, than other Kinds of Grain, and as it is known that the Freſhneſs of Manure makes it the more liable to the Accident, no ſmall Encloſure that has been newly dung'd, ſhould be ſown with Wheat; but it ſhould in theſe Places follow ſome other Crop, as we have ſhewn various Methods of managing it in that Reſpect.

Of all the Kinds of Wheat, that which is called bearded Wheat is leaſt liable to Mildew; this Kind ſhould be ſown preferably to any other, in Places where the Mildew is likely to happen. The Reaſon of bearded Wheat eſcaping better than other Kinds is, that its Juices are thinner, though they be equally rich; ſo that when they are drawn forth by the Sun, they do not hang upon the Plant in that clammy Manner.

This Incident in Nature ſhews the Method of attempting to prevent the ſame Accident by Art, by thinning the Juices of the Plant. Manures take various Effects, and the two contrary are Dung and Soot. Experiments ſhew, that the Juices of Plants enriched by Dung are the thickeſt of all others; and that the Juices of thoſe enriched by Soot are the thinneſt, although the Encreaſe in Grain be as great from one Manure as from the other. For this Reaſon let the Farmer manure with Soot, where he has Reaſon to fear the Mildew; and he may by that Means prevent it.

Thoſe Reaſons have always moſt Weight which

are ſupported by Experience, and we have its Authority in this Caſe.

HERTFORDSHIRE is the County where moſt Soot is uſed as a Manure, and I ſpeak from Experience, that no County is in general ſo free from this Accident.

Finally, the Farmer will find by examining from Year to Year, his own Crop, that the Wheat which is ſown lateſt is moſt ſubject to Mildew; and that which is ſown early very ſeldom ſuffers by this Accident.

This is a very important Conſideration; and he will find it the moſt eſſential of all Means for Prevention of this Diſorder. Every Advantage is on the Side of early ſowing of Wheat, and this among the Principal of them. Mildews come uſually at a certain Time of the Summer; and the Corn that is tendereſt at that Time, is moſt ſubject to be damaged by them; when it has got a certain Degree of Strength, this Accident will not be able to take much Effect upon it.

A good Huſbandman, when he ſees what will in every Reſpect moſt favour his Crops, eſpecially this of Wheat, which is the richeſt of them all, will provide accordingly, that he may take the Advantage; and of all the Times in the Year he will find the Month of AUGUST to be the beſt for this ſowing.

The Farmers who have been taught to believe Mildews came from the Clouds, have been led into a weak Neglect of preparing againſt them: our Reader, who ſees what they are, and how cauſed, will find on the other Hand that ſo much may be done to prevent this Miſchief, that upon providing in Time for the taking every Precaution, he will be under almoſt a moral Certainty of their eſcaping.

If he will give his Encloſures Air Paſſages, ſow his Wheat in them at an early Seaſon, and that after another Crop, not upon Dung, and with the Advantage of Soot Dreſſing, he will need to have very little Fear of this terrible Accident. It may happen at any Time, and under any Circumſtances, for there is no guarding againſt the Extream of ſome Seaſons; but he will nine Times in ten eſcape by this Practice; and ſee his own Fields healthful, while his Neighbours are worth little. We ſhall, in the ſucceeding Chapter, ſhew what is to be done by Way of Remedy when the Accident happens: but 'tis much better to prevent ſuch Accidents as theſe, than to remedy them, and happily for the Farmer it is much eaſier.

CHAP. XXV.

Of the Remedies of Mildew.

WHEN the Crop has, by a Neglect of any of the needful Cautions laid down in the preceding Chapter, fallen under the Misfortune of a Mildew, the Farmer is not to give it up at once, as entirely loſt, but to endeavour every thing for remedying the Diſorder. He could not go about this without the Knowledge we have given him of its Nature, but if he conſider this, and obſerve the Relief he ſometimes obtains from Nature, he will be led into a right Path for the helping himſelf. Art, on moſt Occaſions, does beſt when it moſt imitates Nature; but in theſe Caſes there is no Way elſe by which it can be ſerviceable.

The Mildew is a thick clammy Moiſture, which remaining upon Plants ſtops their Pores, and obſtructs their Growth, and the ripening of their Seeds. Nature waſhes it off by Rains, and blows it away when diſſolved in Dew by Rains.

If Rain and Wind come ſoon after the Accident, the Farmer therefore knows he has nothing to fear; but a few Days if they do not will be of vaſt Prejudice to him, therefore this is the Time he is to ſeize for the doing himſelf Service.

If a little Rain fall gently, and without any Wind, let him go into his Field and ſee whether it have done the Buſineſs: let him examine the Corn by his Sight and Touch, and he will ſoon find whether the Remedy ſent by Nature has been or will be effectual. If he find the clammy Liquor waſhed away he may ſit down in Peace; but if it remain upon the Corn he may expect Damage, and muſt prepare to aſſiſt in the Remedy.

I have ſeen when a ſoft Rain coming immediately after a Mildew has been of the greateſt Diſadvantage, inſtead of any Benefit. The Mildew itſelf has only lodged upon the Tops of ſome Plants, and on the Stalks and Leaves of others in ſmall Parcels, ſtaining them and corrupting them more or leſs in thoſe particular Spots. But when ſuch a drizzling Rain has fallen, it has diſſolved the thick Juice which cauſed the Mildew, without being able to carry it off. In this Manner it has ſpread it in a Kind of Glazing over the greateſt Part of the Plant, whereas naturally it would have only affected a few Places. This is the worſt Sort of Mildew that can happen; and in this Caſe, when Nature has taken the firſt Step, but is not able to perform the whole Cure, Art is to be called in to her Aſſiſtance.

In this Situation, which the Farmer will eaſily know from the Account here given of it, let him ſend a couple, or according to the Size of the Field, more ſtout and careful Fellows in: let each of theſe cut a long, pliant, and well tufted Aſh Bough, and leave all the Branches, Shoots, and Leaves upon them, except a few that may be cut off, juſt for the Convenience of handling them.

Let theſe Men thus prepared go into the Furrows, dividing Piece by Piece the whole Field between them, and let them ſweep off the Wet and Mildew together, with ſoft Strokes of their Aſh Boughs.

Theſe, with their Leaves, will make a Kind of ſoft and full bodied Bruſhes, which will ſweep off all without breaking a ſingle Stalk. The Strokes are to be made firſt very gently down, and then with a gentle ſlanting upwards, carrying on the Boughs a Yard or two before they are brought above the Tops of the Plants. This is a ſecure and perfect Method of getting rid of the Mildew when ſome Rain has fallen, and there is no Wind to aſſiſt. It does the Buſineſs much more perfectly: it is a Way of waſhing and wiping every Stem; and is in this Manner done with very little Trouble.

When a Mildew is ſeen upon the Crop, and there comes no Rain to waſh it away, the firſt

Conſideration is, whether there be a good favourable Dew. In this Caſe the ſame Aſſiſtance may be given by Art, as in the other; and the Damage altogether prevented. The Dew will hang in large Drops, and is more eaſily got off than the Rain; and it melts the Mildew as effectually. If it remain till the Sun evaporate it, then the Mildew is left behind, for Heat draws up only Water; but if it be carried off any way before the Sun's Heat take this Effect, the thick Juice, cauſing the Mildew, is carried away with it, and all Damage is prevented.

A briſk Wind, blowing early in the Morning, will effect this; but, if there be none, ſome ſuch Courſe muſt be uſed as in the former Caſe: but as the Dew hangs in larger Drops than the Rain, it will be eaſier diſlodged, and therefore a ſhorter Method may be taken than the bruſhing it off by Aſh-Boughs. To this Purpoſe, a Couple of Men muſt be ſent into the Field an Hour before Sun-Riſe, with a long Cord; they muſt walk in the Furrows at the Diſtance of the Length of the Cord; and one holding one End, and the other the other, they are thus to draw it over the Crop: this will lay ſo much hold, as to ſhake off all the Dew-drops; and the clammy Juice, which cauſes the Mildew, will go with them.

This is a ſhort, eaſy, and expeditious Method, and it rarely fails of Succeſs; no Injury whatever is done to the Corn, and the clammy Juice, thus rubbed off and ſcattered on the Ground, diſſolved as it is in the Dew, ſerves as a kind of Manure; for nothing is richer than it, and the Whole gets to the Root.

In theſe Caſes, we ſee the Boughs or the Cord ſerve in the Place of Winds, to ſhake off the Water in which the miſchievous Matter is lodged. But we have obſerved that, as in ſome Inſtances, there may want Wind, while there is enough Water, ſo, in others, there may want both. There may be no Showers, and the Nights may yield no Dew: this is a Condition nearly deſperate to the Huſbandman: no bruſhing or ſhaking will diſlodge the clammy Moiſture, when it is not diſſolved firſt; and even the ſtrongeſt Winds would, in this Caſe, anſwer no Purpoſe.

As the Office of a Wind may be performed by Art, as we have ſhewn, ſo that of Rain and Dew might, if there were Conveniences; but they are commonly wanting on ſuch Occaſions.

If the Crop be of ſmall Extent, and there happen to be a Pond or Spring of Water near, the Owner may ſprinkle over the Whole with an Engine, with a Fan full of ſmall Holes at its Top; and, after this, the Boughs or the Cord, according to the Exigence of the Caſe, will anſwer the Purpoſe. Thus the Mildew may be diluted and cleared off, by Means altogether artificial: but there ſeldom are Opportunities of doing it: indeed, never in the full Extent in very large Concerns. However, by this the Huſbandman ſees the Compaſs of what he can do, or what he can attempt, and he may ſuit his Operations to the Occaſions.

The Crops of Corn are not the only ones which may require the Huſbandman's Care in this Particular; many other Growths are as frequently affected by it; indeed, all Kinds are more or leſs liable to it, and he is therefore to watch in every Inſtance, and uſe this Precaution for every Particular; which, in many other Kinds, will come more eaſily into Uſe than in this.

We have recommended to him the planting of Hops, and promiſed him very great Advantages from that Crop; but Hops are no more exempt from Mildew than other Growths: frequently they are damaged, and ſometimes they are altogether deſtroyed by this Accident.

There is no Crop needs more careful Watching on this Account. We have laid down the Methods of examining whether it be coming on; and, according to the early Notice of the Miſchief, obtained by theſe Means, will be the Proſpect of Succeſs in the Remedy.

As ſoon as the leaſt Appearance of it is perceived, let the Plants be watched; and, after a Shower, if any falls, or, if not, early in the Morning, while they are wet with Dew, let them be well ſhook, Poles and all; if this do not prove ſufficient, let them be bruſhed with the Aſh-Boughs, taking Care not to hurt them, for it will be eaſy with theſe leafy Bruſhes to wipe over every Part, and not bruiſe or break any.

When there is Rain or Dew, this Method will be ſure of Succeſs in the mildewed Hop-Ground; and when there is neither, the Engine muſt be called in to ſprinkle the Plants.

This may be done very conveniently and eaſily in a Hop-Ground, tho' it can ſcarce be performed at all in a Corn-Field of any Extent; and it will be very well worth the Labour, becauſe it will anſwer a double Purpoſe: it will at once clean the Plants, and water the Ground. This is always uſeful, in the higheſt Degree, to Hops, when the Seaſon is dry toward the Time of their growing to Ripeneſs: and frequently it will happen, that the Produce ſhall be greater after this, than if no ſuch Accident had happened.

CHAP. XXVII.

Of Smuttineſs of Corn.

WE have ſhewn that dry Summers are the moſt ſubject to Mildew; and, on the contrary, Corn is moſt apt to be ſmutty in ſuch as are cold and wet. Indeed, this ſeems one principal Cauſe of the Accident.

When Wheat is ſmutty, the Grains, inſtead of containing a fine white Flour, are full of a black Powder of a diſagreeable Taſte and offenſive Smell.

This is a very unfortunate Accident, becauſe it debaſes the Value of the Grain more than any Thing, and is apt to continue when it has once got footing. Sometimes it thus altogether alters the Colour and Quality of the fine Flour of the Corn, ſometimes it only affects it in Part; but the leaſt Article of this Damage is very much to be dreaded.

Nothing is more eſſential to the Huſbandman than to know the Cauſes of thoſe Accidents which his Intereſt is ſo deeply concerned to remedy; nor is any Thing more difficult for him to attain: for in this, as in other Articles of a like Kind, thoſe who ſhould inform are too apt to miſlead him.

We have ſhewn him how, in the Articles of Blights and Mildews, thoſe Inſects, which came to feed upon the accidental Flowing of the Juices from the Diſorder, are ſuppoſed to be the Cauſe of it: and the Caſe is exactly the ſame here.

Mr. BRADLEY accuſes the Eaſt Wind of bringing Inſects, which occaſion this Damage, by eating up the proper Juices of the Corn, and mixing their own with it: and long after Mr. TURBERVILLE NEEDHAM ſhewed the Royal Society, that in all ſmutty Corn there are ſuch Animals.

It is certain, that wherever there is a Corruption, either of Animal or Vegetable Subſtances, theſe Inſects are to be found: but the Farmer is to be told, theſe Writers take the Effect for the Cauſe. The Maggots hatched from the Eggs of Flies in putrified Meat, are no more the Occaſion of that Putrefaction, than the Worms found in ſmutty Wheat are of the Smut. The decayed State of each Kind affords a proper Nouriſhment for theſe little Animals; and wherever there is a Place for them, and Food for their Support, pregnant Nature ſends them. Their Eggs fly about innumerably in the Air, and tho' Millions periſh, thoſe few which happen to lodge where there is a proper Place, will always live, and they will be enough to propagate their Species, and to continue the Miſchief.

It is of the utmoſt Conſequence to inform the Farmer of Errors into which he might be led, reſpecting the Cauſe of theſe Accidents which affect his Crops, for a Miſtake in that fundadamental Article, leads him into an Error in his whole Practice.

If he ſuppoſed, according to thoſe Writers, that Inſects were the Occaſion of Smuttineſs, and that an Eaſt Wind brought thoſe Inſects, he would think he had nothing to do but to plant out the Annoyance, and defend his Fields againſt that Quarter.

We can aſſure him, from Experience, he would not be at all the ſafer from Smut from this Precaution; and nothing is ſo prejudicial as depending upon a wrong Method, inſtead of ſeeking out the right. Many have periſhed miſerably by eating the Liver of a mad Dog as a Remedy for his Bite, whom the Salt Water would have ſaved from that terrible Cataſtrophe. In leſſer and in greater Matters the ſame Caution is to be given againſt depending upon fallacious Remedies.

Having ſhewn the Farmer what is not the Cauſe of Smuttineſs in his Wheat, we ſhall conduct him to a rational Search in order to find what is; for till he knows that he can promiſe himſelf little Succeſs in preventing the Accident.

The more Learned among thoſe who have written on Huſbandry, are they who ſay Inſects are the Cauſe of Smuttineſs; and thoſe of the plainer Claſs attribute it to the Soil: but here our enquiring Huſbandman will find himſelf as much perplexed as ever; one ſaying that it is the Over-rankneſs of the Land which occaſions the Diſorder, as MORTIMER; another, that its Poorneſs is the Cauſe, as BLAGRAVE; and ſome attributing it to both; as thoſe modern Compilers, whom Tenderneſs even to well intended Dulneſs, commands us to ſpare, who have collected without Examination, and wrote down without Thought, the Words of one Author at the Beginning, and thoſe of another at the End, tho' exactly contradictory; forming, without Remarks, a Whole, from theſe diſagreeing Parts.

As ſome of the practical Writers attribute the Smuttineſs of Corn to the Qualities of the Land; others lay it on the Conduct of the Farmer: ſome of theſe tell him, that the laying rotten Vegetables on the Ground, by way of Manure, is the Occaſion of Smut in the Wheat, as WORLIDGE; who by that Obſervation would terrify the Farmer from the Uſe of a very good, cheap, and harmleſs Manure: and others inform him, that ſmutty Seed raiſes a ſmutty Crop, and ſo attribute all to the Choice of the Seed-Corn.

Among this Variety of Sentiments, all adopted by Writers of ſome Reputation, the Farmer knows not which to chuſe or credit: and ſo unhappily is he circumſtanced, that wherever he fixes among them he will chuſe wrong. We have ſhewn him what has been ſaid, that he may avoid paying too much Regard to it; and ſhall, after this, direct him, by his own Obſervation, to diſcover the Cauſe of the Diſorder; after which he will rationally proceed to the finding a Remedy.

CHAP. XXVIII.

Of the real Cauſe of Smut.

THE enquiring Huſbandman will firſt ſee, on examining the Nature of ſmutty Corn, that there is a great deal of Difference in the Diſorder, according to the Degree of it. When it is in the full Height of its Miſchief, the whole inner Subſtance of the Corn is black as Ink, of a faint, nauſeous Taſte, a bad Smell, and of offenſive Qualities, occaſioning Sickneſs in thoſe who eat Bread made of Flour in which there was much of it. In this Caſe, if the Corn be bruiſed, and ſteeped in Water, it preſently ſhews innumerable Worms, like little Eels, living in every Part of it.

When the Diſorder is not arrived to this full Height, the inner Subſtance of the Corn is not then entirely hurt, but the Outſide is ſpotted with black; and, in ſome Corns, a Part of the Flour within. This makes a great Change in the Matter; for the firſt is wholly deſtroyed, whereas the other may ſometimes be recovered for certain Uſes, though not for all Services.

When our Huſbandman underſtands this Difference in the Degree of the Diſorder, let him firſt recollect what his Memory will recall to him, as to the Circumſtances of former Years, and then examine the preſent: this Way and this only will lead him to the Truth.

He will remember that there have been certain Seaſons when a great deal of Corn was ſmutted; and others, where very little ſuffered that Accident. Let him call to Mind the particular Circumſtances, and he will find that all thoſe Years, when there has been ſo much of the ſmutty Corn, were cold and wet; and that thoſe which ſhewed leaſt of this Accident, have been the hot and dry.

This firſt Principle then will be eſtabliſhed in Reaſon, upon the Teſtimony of Experience, that a cold

a cold wet Summer is one principal Cauſe of Smuttineſs in Corn: and this will be of great Uſe, as it will aſſiſt in explaining to him the particular Cauſes; and warn him when he is moſt rationally to expect the Damage, and therefore when he is to guard againſt it.

England is more ſubject to this Diſorder of Corn than any other Country we know; and this is owing to the ſame Cauſe, our frequent wet Summers: in the warm and naturally dry Countries it is not known at all, or not in a Degree worth Notice.

In Egypt no Age ever ſaw a black Grain of any Corn; for in Egypt they have no Rain: and even in Italy it is little regarded now; and was ſo ſlighted in earlier Time, that all the Roman Writers have not a Name for it. There is not a Word for Smut in the Latin Language. The Reader muſt not cenſure this Aſſertion, if ſome modern Writers, in that Language, have attempted to name it: they uſe Words which properly expreſs Blight and Mildew: to both theſe the old Roman Fields were ſubject, therefore they have Terms to expreſs them; but this was little known, and leſs regarded.

When our Farmer has led himſelf into a juſt Knowledge of the Cauſe of Smut, let him add Obſervation to the Information of his Memory.

In a wet Summer, let him examine his own Crops, and thoſe of his Neighbours, and obſerve whoſe Corn is infected with this Malady, and in what Degree.

We have made the Obſervation ſo ſtrictly before him, that we can inform him what will be the Reſult of his Enquiry. He will find a great deal of Corn infected with the Accident in theſe Summers; and that moſt which is upon the pooreſt Land, and the wetteſt. Theſe are the two Things that concur with an unfavourable Summer, to occaſion Smut, and he need look no farther for the real Cauſe.

He will perceive that in moſt Grounds there will be ſome ſmutty Ears, ſuch a Seaſon; but in the pooreſt and wetteſt, moſt; in proper and well managed Land he will ſee but few, and thoſe ſmutted, in general, but imperfectly; a very ſmall Part of them will have the Diſorder in its full Force, having the Corn converted to a black Duſt, the reſt will only be here and there ſpotted on the Surface. Next let him examine a poor Land, not particularly wet, and he will ſee moſt of the Corn there ſpecked and ſpotted, tho' but a ſmall Part is abſolutely rotted with the Smut; but in a Field that is poor and wet both, he will find the greateſt Part perfectly ſmutty.

This will be the natural Reſult of the Soils and Seaſon; and from this he will form a Judgment of what Smut is, very different from what he has read; ſuch is the Difference between reading, in general, and ſeeing; and he will no longer attribute the Diſorder to Inſects or Eaſt Winds, but ſee it as a natural Effect of an unfavourable Seaſon upon an unkindly Soil: he will ſee cold and wet Summers the principal Occaſion; and he will find alſo that they take moſt Effect where the Huſbandman has been leaſt regardful of his Duty: and he will thus be led to a proper Conduct.

He will perceive in the ſame Kind of Soils a great Difference in the Degree of the Diſorder; and this will lead him to examine into the Occaſion; which he will find to be the better Management in the Article of ſowing; and the Change or the Preparation of the Seed: theſe are Articles we are to enquire into in a ſucceeding Chapter; 'tis enough that we have here led him to find by his own Remembrance and Obſervation, what is the true Cauſe of Smut, and ſettled him in a right Notion with Reſpect to ſo much of his Conduct.

He will now know, that neither the Richneſs of the Land in general, nor any Kind of Manure in particular, are the Cauſe of Smuttineſs in Corn, though both theſe have been aſſerted; and he might have been miſled by ſuch Accounts. He will therefore not be afraid to enrich his Land in general, nor to uſe any Kind of Manure in particular; but will know, that the Seaſon is the great Cauſe of the Malady, and that it takes moſt Effect on the pooreſt and the wetteſt Grounds: therefore he will bend his Mind to the draining and enriching thoſe Lands he ſuſpects moſt as being liable to Smut; and will conſider that every thing which impoveriſhes his Land is a Cauſe of this Diſtemperature; and every thing that puts it in Heart, is a Defence againſt it.

CHAP. XXIX.

Of the preventing of Smuttineſs by a due Care of the Land.

WE are now acquainted with the Cauſe of this Accident; and therefore are in a rational Way of guarding againſt it. In order to this every Thing is to be done that can give Strength to the Crop. The two Things that make Land afford abundant Nouriſhment are Tillage and Manure; and of theſe great Tillage is the beſt for the preventing this Diſorder.

We ſpeak here from Experience; we have ſeen Lands, where no Care about the Seed and other Articles could prevent frequent ſmutty Crops, which have yet been cured by repeated Plowings.

As Smut may ariſe from theſe ſeveral Cauſes, a too abundant Moiſture, a Poorneſs of the Land, and an ill Conduct in the ſowing, let them be ſeverally guarded againſt by the careful Huſbandman, and he will have the farther Encouragement to be careful in this Reſpect; that every thing he is to do to prevent Smut, will alſo enrich and improve his Land. He will by this rational Conduct not only ſecure to himſelf a cleaner, but a larger Crop.

In the firſt Place, if his Land be poor let him uſe the ſeveral Methods we have before related for the Improvement of it; and if it lie liable to Wet let him lay it high, and cut the Furrows deep and in proper Direction. This we have explained at large already, ſo that it needs only be named here. 'Tis enough that we tell him it is to be done; we have elſewhere ſhewn him how to do it.

As a great deal of Tillage is the beſt Way of en-

enriching Land to prevent Smut, it follows that the Horſe-hoeing Huſbandry is particularly calculated to prevent this Damage; and what is thus pointed out by Reaſon is alſo confirmed by Experience; for upon repeated Examination we have found, that Land managed in this Method is not nearly ſo ſubject to ſmutty Crops, as that in the common Courſe of Huſbandry.

But as we no where recommend Tillage alone, but on every Occaſion would have the Improvement of Land owing partly to this, and partly to Manure, it is needful here to ſpeak of the Kind of Dreſſings that are moſt proper. We have directed the Farmer already to adapt his Manures to his Soils in a general Way; and that is a Point he muſt always keep in his Memory: but as this does not tie him down to any one particular Dreſſing for any one Soil, he has ſtill a Choice, which, though it does not go through the whole Range of theſe Materials, yet is enough to be very ſerviceable to him on the preſent Occaſion.

As he ſees that Dampneſs has a very great Share in the occaſioning of Smut, he ſhould chuſe the dry and warm rather than the fat and moiſt Manures: thus freſh Dung is one of the worſt Dreſſings for a Piece of Land inclined to ſmut the Corn; and of all that can be choſen, Lime is the moſt proper.

We have named the two Extreams; the Farmer will know there is a great Variety of Articles between them: let him take any of theſe according to the Nature of his Land, and the other Circumſtances.

In this Point Experience confirms, as in the others the Dictates of Reaſon. Upon an Enquiry among the moſt experienced Farmers in different Counties, we find that there is no Part of the Kingdom ſo free from Smut as Derbyshire, where they uſe a vaſt deal of Lime; and in general, that the Places where it is moſt common, are thoſe in the Neighbourhood of great Towns, where there is Abundance of Dung uſed in the Dreſſings.

Thus far we have conſidered the Article of preventing Smut, by a due Care of the Ground; the Reſult of which is, that the Farmer who knows where the Danger lies will beſt guard againſt it, by keeping his Land in good Heart by warm Manures and frequent Tillage, and by laying it in ſuch a Manner that it may have the moſt Advantage poſſible of the Sun, and the leaſt Damage from Wet; according to the Rules we have laid down in their Place upon thoſe different Heads.

CHAP. XXX.

Of the Prevention of Smut by the Conduct in Sowing.

WHEN the Farmer has prepared his Land for the Reception of his Seed Corn, ſo as to have it the leaſt likely to be damaged by Smut, he is to conſider what will tend to make the Crop liable to it, and what will be moſt likely to defend it againſt that Accident in the Article of ſowing. The Crops which are moſt ſubject to it, are ſuch as are ſtarved, and ſuch as are chilled: againſt the chilling of them we have ſaid all that can be needful in the preceding Chapter; and the Directions we have given about the Uſe of right Manures and frequent Tillage, will tend greatly to the preventing their being ſtarved; but the Farmer will recollect that there is another Article which always tends to the impoveriſhing a Crop, which is the ſowing the ſame Seed again and again upon the ſame Ground.

Whatever tends to the impoveriſhing the Crop, always tends in the ſame Degree to the ſubjecting it to Smut. This is a plain Reſult of what we have ſhewn before, that the Poorneſs of the Growth, from whatever Cauſe it ariſes, is one of the two great Sources of Smut.

The Change of Seed Wheat is very eaſy, becauſe it is every ones Intereſt; and as the Farmers of different Parts are to be mutual Gainers by it, they will doubtleſs be ready at all Times to do it: in this we ſhall only give the general Caution, that the Farmer on both Sides behave with Integrity, ſending in his beſt Corn in the Exchange; for nothing but that can keep up the Credit of this uſeful Intercourſe.

There has been an Opinion, that ſmutty Grains will grow up into a ſmutty Ear: but this is an Error; for they will not grow at all. However, they will do juſt as much Damage in the Ground as if they did: for if many of them be ſown among better Corn, they will ſpread the Infection of their Juices in the Land, and produce the ſame Effect as if they could grow themſelves; or indeed worſe, becauſe they will infect farther.

In the Caſe of ſowing Wheat, among which ſome is ſmutty, the Effect is this: the ſmutty Grains break and diſſolve in the Ground, at the ſame Time that the others ſwell and ſhoot out their firſt Roots: when theſe are juſt taking in their firſt Nouriſhment, the rotted Corns of the ſmutted Kind afford their Juices to them: they take in this, and it gives a Tendency to Smuttineſs in the whole.

The Farmer thus ſees a very plain Reaſon againſt ſowing Corn that has any ſmutty Grains among it; it is indeed worſe upon this true Principle, than upon that falſe and fooliſh one others have aſſumed, of thoſe Grains growing.

This will ſtand as a Caution to the Huſbandman, that when he ſends Corn in Exchange, he does not for his Credit Sake ſend ſuch as has any Smut among it; and that when he receives Seed Corn in Exchange from another, he look it carefully over, before he prepare it farther for ſowing.

A clean Seed is ſo neceſſary on this Occaſion, that he ſhould not ſuffer a Grain to be ſowed that has the leaſt Speck upon it; nor any that has been waſhed or otherwiſe cleaned; for it is not certain, nor indeed probable, that any cleaning of Grain once ſmutted, can make it fit for this Purpoſe.

This Caution being eſtabliſhed in the Examination and picking of the Seed Corn, the Advantage will be very great in the receiving it from another Part of the Country. Nothing

a cold wet Summer is one principal Cauſe of Smuttineſs in Corn: and this will be of great Uſe, as it will aſſiſt in explaining to him the particular Cauſes; and warn him when he is moſt rationally to expect the Damage, and therefore when he is to guard againſt it.

England is more ſubject to this Diſorder of Corn than any other Country we know; and this is owing to the ſame Cauſe, our frequent wet Summers: in the warm and naturally dry Countries it is not known at all, or not in a Degree worth Notice.

In Egypt no Age ever ſaw a black Grain of any Corn; for in Egypt they have no Rain: and even in Italy it is little regarded now; and was ſo ſlighted in earlier Time, that all the Roman Writers have not a Name for it. There is not a Word for Smut in the Latin Language. The Reader muſt not cenſure this Aſſertion, if ſome modern Writers, in that Language, have attempted to name it: they uſe Words which properly expreſs Blight and Mildew: to both theſe the old Roman Fields were ſubject, therefore they have Terms to expreſs them; but this was little known, and leſs regarded.

When our Farmer has led himſelf into a juſt Knowledge of the Cauſe of Smut, let him add Obſervation to the Information of his Memory.

In a wet Summer, let him examine his own Crops, and thoſe of his Neighbours, and obſerve whoſe Corn is infected with this Malady, and in what Degree.

We have made the Obſervation ſo ſtrictly before him, that we can inform him what will be the Reſult of his Enquiry. He will find a great deal of Corn infected with the Accident in theſe Summers; and that moſt which is upon the pooreſt Land, and the wetteſt. Theſe are the two Things that concur with an unfavourable Summer, to occaſion Smut, and he need look no farther for the real Cauſe.

He will perceive that in moſt Grounds there will be ſome ſmutty Ears, ſuch a Seaſon; but in the pooreſt and wetteſt, moſt; in proper and well managed Land he will ſee but few, and thoſe ſmutted, in general, but imperfectly; a very ſmall Part of them will have the Diſorder in its full Force, having the Corn converted to a black Duſt, the reſt will only be here and there ſpotted on the Surface. Next let him examine a poor Land, not particularly wet, and he will ſee moſt of the Corn there ſpecked and ſpotted, tho' but a ſmall Part is abſolutely rotted with the Smut; but in a Field that is poor and wet both, he will find the greateſt Part perfectly ſmutty.

This will be the natural Reſult of the Soils and Seaſon; and from this he will form a Judgment of what Smut is, very different from what he has read; ſuch is the Difference between reading, in general, and ſeeing; and he will no longer attribute the Diſorder to Inſects or Eaſt Winds, but ſee it as a natural Effect of an unfavourable Seaſon upon an unkindly Soil: he will ſee cold and wet Summers the principal Occaſion; and he will find alſo that they take moſt Effect where the Huſbandman has been leaſt regardful of his Duty: and he will thus be led to a proper Conduct.

He will perceive in the ſame Kind of Soils a great Difference in the Degree of the Diſorder; and this will lead him to examine into the Occaſion; which he will find to be the better Management in the Article of ſowing; and the Change or the Preparation of the Seed: theſe are Articles we are to enquire into in a ſucceeding Chapter; 'tis enough that we have here led him to find by his own Remembrance and Obſervation, what is the true Cauſe of Smut, and ſettled him in a right Notion with Reſpect to ſo much of his Conduct.

He will now know, that neither the Richneſs of the Land in general, nor any Kind of Manure in particular, are the Cauſe of Smuttineſs in Corn, though both theſe have been aſſerted; and he might have been miſled by ſuch Accounts. He will therefore not be afraid to enrich his Land in general, nor to uſe any Kind of Manure in particular; but will know, that the Seaſon is the great Cauſe of the Malady, and that it takes moſt Effect on the pooreſt and the wetteſt Grounds: therefore he will bend his Mind to the draining and enriching thoſe Lands he ſuſpects moſt as being liable to Smut; and will conſider that every thing which impoveriſhes his Land is a Cauſe of this Diſtemperature; and every thing that puts it in Heart, is a Defence againſt it.

CHAP. XXIX.

Of the preventing of Smuttineſs by a due Care of the Land.

WE are now acquainted with the Cauſe of this Accident; and therefore are in a rational Way of guarding againſt it. In order to this every Thing is to be done that can give Strength to the Crop. The two Things that make Land afford abundant Nouriſhment are Tillage and Manure; and of theſe great Tillage is the beſt for the preventing this Diſorder.

We ſpeak here from Experience; we have ſeen Lands, where no Care about the Seed and other Articles could prevent frequent ſmutty Crops, which have yet been cured by repeated Plowings.

As Smut may ariſe from theſe ſeveral Cauſes, a too abundant Moiſture, a Poorneſs of the Land, and an ill Conduct in the ſowing, let them be ſeverally guarded againſt by the careful Huſbandman, and he will have the farther Encouragement to be careful in this Reſpect; that every thing he is to do to prevent Smut, will alſo enrich and improve his Land. He will by this rational Conduct not only ſecure to himſelf a cleaner, but a larger Crop.

In the firſt Place, if his Land be poor let him uſe the ſeveral Methods we have before related for the Improvement of it; and if it lie liable to Wet let him lay it high, and cut the Furrows deep and in proper Direction. This we have explained at large already, ſo that it needs only be named here. 'Tis enough that we tell him it is to be done; we have elſewhere ſhewn him how to do it.

As a great deal of Tillage is the beſt Way of en-

enriching Land to prevent Smut, it follows that the Horſe-hoeing Huſbandry is particularly calculated to prevent this Damage; and what is thus pointed out by Reaſon is alſo confirmed by Experience; for upon repeated Examination we have found, that Land managed in this Method is not nearly ſo ſubject to ſmutty Crops, as that in the common Courſe of Huſbandry.

But as we no where recommend Tillage alone, but on every Occaſion would have the Improvement of Land owing partly to this, and partly to Manure, it is needful here to ſpeak of the Kind of Dreſſings that are moſt proper. We have directed the Farmer already to adapt his Manures to his Soils in a general Way; and that is a Point he muſt always keep in his Memory: but as this does not tie him down to any one particular Dreſſing for any one Soil, he has ſtill a Choice, which, though it does not go through the whole Range of theſe Materials, yet is enough to be very ſerviceable to him on the preſent Occaſion.

As he ſees that Dampneſs has a very great Share in the occaſioning of Smut, he ſhould chuſe the dry and warm rather than the fat and moiſt Manures: thus freſh Dung is one of the worſt Dreſſings for a Piece of Land inclined to ſmut the Corn; and of all that can be choſen, Lime is the moſt proper.

We have named the two Extreams; the Farmer will know there is a great Variety of Articles between them: let him take any of theſe according to the Nature of his Land, and the other Circumſtances.

In this Point Experience confirms, as in the others the Dictates of Reaſon. Upon an Enquiry among the moſt experienced Farmers in different Counties, we find that there is no Part of the Kingdom ſo free from Smut as Derbyshire, where they uſe a vaſt deal of Lime; and in general, that the Places where it is moſt common, are thoſe in the Neighbourhood of great Towns, where there is Abundance of Dung uſed in the Dreſſings.

Thus far we have conſidered the Article of preventing Smut, by a due Care of the Ground; the Reſult of which is, that the Farmer who knows where the Danger lies will beſt guard againſt it, by keeping his Land in good Heart by warm Manures and frequent Tillage, and by laying it in ſuch a Manner that it may have the moſt Advantage poſſible of the Sun, and the leaſt Damage from Wet; according to the Rules we have laid down in their Place upon thoſe different Heads.

CHAP. XXX.

Of the Prevention of Smut by the Conduct in Sowing.

WHEN the Farmer has prepared his Land for the Reception of his Seed Corn, ſo as to have it the leaſt likely to be damaged by Smut, he is to conſider what will tend to make the Crop liable to it, and what will be moſt likely to defend it againſt that Accident in the Article of ſowing. The Crops which are moſt ſubject to it, are ſuch as are ſtarved, and ſuch as are chilled: againſt the chilling of them we have ſaid all that can be needful in the preceding Chapter; and the Directions we have given about the Uſe of right Manures and frequent Tillage, will tend greatly to the preventing their being ſtarved; but the Farmer will recollect that there is another Article which always tends to the impoveriſhing a Crop, which is the ſowing the ſame Seed again and again upon the ſame Ground.

Whatever tends to the impoveriſhing the Crop, always tends in the ſame Degree to the ſubjecting it to Smut. This is a plain Reſult of what we have ſhewn before, that the Poorneſs of the Growth, from whatever Cauſe it ariſes, is one of the two great Sources of Smut.

The Change of Seed Wheat is very eaſy, becauſe it is every ones Intereſt; and as the Farmers of different Parts are to be mutual Gainers by it, they will doubtleſs be ready at all Times to do it: in this we ſhall only give the general Caution, that the Farmer on both Sides behave with Integrity, ſending in his beſt Corn in the Exchange; for nothing but that can keep up the Credit of this uſeful Intercourſe.

There has been an Opinion, that ſmutty Grains will grow up into a ſmutty Ear: but this is an Error; for they will not grow at all. However, they will do juſt as much Damage in the Ground as if they did: for if many of them be ſown among better Corn, they will ſpread the Infection of their Juices in the Land, and produce the ſame Effect as if they could grow themſelves; or indeed worſe, becauſe they will infect farther.

In the Caſe of ſowing Wheat, among which ſome is ſmutty, the Effect is this: the ſmutty Grains break and diſſolve in the Ground, at the ſame Time that the others ſwell and ſhoot out their firſt Roots: when theſe are juſt taking in their firſt Nouriſhment, the rotted Corns of the ſmutted Kind afford their Juices to them: they take in this, and it gives a Tendency to Smuttineſs in the whole.

The Farmer thus ſees a very plain Reaſon againſt ſowing Corn that has any ſmutty Grains among it; it is indeed worſe upon this true Principle, than upon that falſe and fooliſh one others have aſſumed, of thoſe Grains growing.

This will ſtand as a Caution to the Huſbandman, that when he ſends Corn in Exchange, he does not for his Credit Sake ſend ſuch as has any Smut among it; and that when he receives Seed Corn in Exchange from another, he look it carefully over, before he prepare it farther for ſowing.

A clean Seed is ſo neceſſary on this Occaſion, that he ſhould not ſuffer a Grain to be ſowed that has the leaſt Speck upon it; nor any that has been waſhed or otherwiſe cleaned; for it is not certain, nor indeed probable, that any cleaning of Grain once ſmutted, can make it fit for this Purpoſe.

This Caution being eſtabliſhed in the Examination and picking of the Seed Corn, the Advantage will be very great in the receiving it from another Part of the Country. Nothing

can prevent a Piece of poor wet Ground ſown with ſmutted Corn from being ſmutty; but in the common Courſe of Things, a Crop that would have been liable to this Accident from any apparent Cauſe, will be much more likely to eſcape, if the Seed have been chang'd. This always makes the Growth, under equal Circumſtances, more vigorous; and we have ſhewn that the heartier it is, the more ſafe it always is from this Accident.

Worlidge, and other of the earlier Writers, with one Voice recommend this Change of Seed for the Prevention of Smut; and Mr. Tull propoſes it as the great and certain Remedy.

We ſhall not miſinform the Farmer ſo far as to join Mr. Tull in calling it a certain Remedy; for upon a long Examination of this Matter we have found, that though very uſeful with other Precautions, it will not do alone. This is the worſt Error a Farmer can commit: in depending ſo far even upon a good Article as to omit all others: he is truſting to one Aſſiſtance where he may have many.

It is certain the Change of Seed is a very good and highly uſeful Method; but theſe ſeveral other Precautions we have named have a Right to the ſame Regard. Mr. Tull ſupports his Aſſertion by the Experience of a Gentleman, who changing his Seed with one who alſo chang'd his own every Year, in ten ſucceſſive Years, though ſeveral of them were wet ones, never had one ſmutty Ear in his Crop, though he uſed no other Precautions. He adds, that in ſome of thoſe Years, thoſe who uſed every other Method of Prevention had a great deal of ſmutty Wheat, while he eſcaped. This would tend to lead the Farmer to depend upon the Change alone; but Mr. Tull, though a very honeſt Man, is a very warm Writer; and thoſe Authors are to be read with proper Allowances.

The proper Conduct is to adhere ſtrictly to this uſeful Caution of changing the Seed, without depending upon it alone: and having thus eſtabliſhed the general Practice upon Reaſon, we ſhall examine into the Particulars.

Every Change of Seed will be of Service, both againſt Smut, and in Favour of the general Growth; but the Nature of this Exchange being being well conſidered, the Advantage may be doubled. The Soil makes a great deal of Difference in the Condition of the Corn for ſowing; and Reſpect is to be had to it for that Reaſon.

In general, the Wheat that has grown on a dry ſandy Ground ſhould be all ſold for eating; for it never ſucceeds ſo well as that from other Soils, either upon the ſame Ground again, or upon any other.

As the ſandy is the worſt Land for getting Seed Wheat for a Change; ſo the beſt is that which is of the moſt oppoſite Kind; this is the clayey: and this is not only ſhewn by Reaſon, but teſtified alſo by Experience.

Upon whatever Land Wheat is to be ſowed, there is none ſo proper to bring it from as a tough, firm Soil, that has a good deal of Clay: it will thrive in a Land of the ſame Kind, in a Loam, or even in a Sand.

When the Soil is clayey to which the Wheat is to be brought, none is ſo proper as one of the ſame general Nature; but the whole ſhould not be in every Reſpect alike, becauſe that will be like ſowing the ſame Corn upon the ſame Land, and will abate, if not deſtroy the Advantages of the Exchange. The Colours of clayey Soils uſually ſhew their Differences: and by them we may judge on this Occaſion.

A white Clay is the beſt Soil to take Seed from that is to be ſowed on a red; and a black Clay furniſhes the beſt Wheat for a yellow: in the ſame Manner, interchangeably, the Wheat that has grown on yellow is good for black; and that from red for the white. Theſe, however, are Niceties that need not be obſerved where there is any Difficulty. In general let the Farmer get his Seed from a ſound Soil at a Diſtance from his own Land; and if he can, let him get it of ſome one who changes it yearly himſelf. This, though alone it may be liable to Smut, like other Corn, yet would be leſs ſo than others: but a Seed of this Kind ſown on Land prepared as we have directed, will be abſolutely ſecure.

In the common Courſe of Huſbandry, the changing of the Crop upon any one Piece of Land, is another needful Caution to prevent Smut. This depends on the ſame Principle with the Reſt: often ſowing the ſame Crop on a Piece of Ground makes it weaker; and where Wheat is weak, any Unfavourableneſs of Seaſon will make it ſmutty.

But in the Horſe-hoeing Method this Change of the Crop to the Ground is not neceſſary, tho' a Change of Seed from ſome other Place is. The Reaſon is plain, that in this new Method, tho' the ſame Field be ſown with Wheat ten Years ſucceſſively, the Growth will never be any two Times in the ſame Place; ſo that while the Crop is encloſed in the ſame Hedges, yet it annually grows in a different Parcel of Ground. We can aſſure the Farmer from Experience, that is ſufficient; for if the Seed be changed every Year, though the ſame Field be thus ſown with Wheat ever ſo long, not an Ear of it will ever be ſmutty.

Having thus directed the Farmer in the Choice of his Seed, and the ordering of his Ground, for making his Crop free from Smut, we ſhall in the next Chapter ſhew him in what Manner he is to order it for the ſowing; and ſhall conclude the preſent with one certain and practical Obſervation, that of twenty Crops which are ſmutty, nineteen, if not all, are owing to bad Management or Careleſſneſs in one Article or other of the Preparation.

CHAP. XXXI.

Of preparing the Seed againſt a ſmutty Crop.

THE Practice of ſteeping Seed Corn, which has of late been ſo greatly recommended, and is become ſo univerſal, is in no Article more ſerviceable, than in preventing of Smut. When the former Precautions have been taken for the procuring the right Seed, and dreſſing the Land in a proper Manner, if this be added there is little Fear of Succeſs. In general, the earlier

Wheat

Wheat is ſowed, and the better it is ſteeped before ſowing, the leſs it is liable to be ſmutty. The Reaſon will be obvious to the Reader, who conſiders what we have ſaid of the principal Cauſe of Smut, which, next to the Badneſs of the Seaſon, is the Weakneſs or Poorneſs of the Crop: now early ſowing naturally makes the Growth ſtrong, at a Time when others who have ſown late have it much weaker, becauſe Time never fails to give it this Strength: and the Advantage of ſteeping is juſt of the ſame Kind; for it makes the Crops more vigorous. Let any one look into the ſeveral Fields in a wet, cold Summer, that has ſmutted a great deal of the Wheat, and he will be ſure to find the pooreſt in other equal Circumſtances has ſuffered moſt.

Of the various Methods that have been propoſed for brining of Seed Wheat, there is no Need to uſe any on this Occaſion, but the plaineſt and moſt familiar. Receipts are publiſhed abundantly, in which Copperas, and Allum, and Urine, and the like offenſive Ingredients are recommended; but this is the Act of Fancy, not of Judgment. Moſt think they ſhew the more Skill, the more Ingredients they can crowd into their ſteeping Liquor; as thoſe old Phyſicians, who in the Compoſition of Mithridate and Venice Treacle, ſeem not to have conſidered what would be beſt for the Purpoſes of the Compoſition, but how many Things they could get into the Preſcription.

We would have our Farmer underſtand the Meaning and Deſign of every Thing he does, and he will then find all this Parade is Quackery, the Jargon of a Stage Doctor to conceal Ignorance. Thoſe who do not know which Ingredients uſed in the ſeveral Receipts for ſteeping Liquors are beſt, may put in all, that they may be ſure to have the right among them: but the intelligent Farmer ſhould know the Intent of each, that he may be able to chuſe with Wiſdom on any particular Occaſion.

In the preſent Caſe, all that he expects from the Brine or Steeping Liquor, is to give the Plants a ſpeedy and firm Growth; let him therefore reject all thoſe Ingredients, which have been, as we have ſhewn before, introduced for other Purpoſes; and let him in the preſent Caſe uſe thoſe which tend to promote the Growth only. Theſe are only two, Salt and Lime, and therefore all others are to be rejected.

For this Purpoſe therefore, neglecting all thoſe Receipts which are crowded with uſeleſs, and much more thoſe which are loaded with offenſive Ingredients, let him manage in the following plain and eaſy Manner: firſt let him pour the Seed Wheat into a large Tub, and pump a good Quantity of Water upon it: let him ſtir it well about with a Stick; and then leaving it to ſettle pour off the Water, and pour away all the light Grains that ſwim upon the Top with it.

Then let him pump more Water upon it, and ſtir it about; and repeat the ſame till it has been waſhed four Times: by this Means the Wheat will be well damped and perfectly clean, and every light Grain will be ſeparated from it.

When the Wheat is thus ready for ſteeping, prepare the Brine in the following Manner. Pump a ſufficient Quantity of Water into a Tub that has a Tap to it, and put in as much Salt, weighing what is put in, as will, when diſſolved, make the Brine ſo ſtrong that an Egg will ſwim upon it. This is juſt half the Strength that is required; therefore let as much more Salt by Weight be put in, and let all be well ſtirred about till it melts.

When the Salt is all melted put in the Wheat and ſtir it well about. Let it lie two Nights and a Day, that is, put it into the Brine one Evening, and it will be done enough by the Evening but one afterwards. When it is taken out of the Brine, let it be well covered with ſifted Lime, and then it is ready for ſowing.

This plain and eaſy Method is found by repeated Experience, more ſucceſsful than all the perplexed and complicated Brines; and it is the original Way directed by the Accident that occaſioned it. The firſt brined Wheat ſown in England was the Freight of a Ship, which ſunk near the Shore. The Cargo was ſaved after it had lain ſometime under the Salt Water; and being ſown it produced better than any other in the Neighbourhood. This opened the Eyes of the Farmers to a very material Improvement. The Lime is the only Addition required to it; and this, which ſome think only uſeful as it prepares it for ſowing more conveniently, yet is of much more eſſential Service. Every one knows the Advantage of Lime as a Manure; and there is no Way of uſing it ſo beneficially.

CHAP. XXXII.

Of the cleaning of ſmutty Corn.

THE Farmer ſees what he is to do to prevent Smuttyneſs in his Crop; and we will venture to promiſe him, that if he follow the Inſtructions in every Article, he ſhall have very little Reaſon to complain from that Source: but we are to conſider that he may, before he gets into the Uſe of this Method of Prevention, have a ſmutty Crop, and we are not to leave him uninformed of the Methods by which he is to make the beſt of it.

Thoſe Ears that ſhew themſelves to be utterly rotted, and converted into a black Powder, ſhould be picked out; and when theſe are ſeparated, the reſt may be managed in the following Manner.

Let the whole Quantity be put into a very large Veſſel, and Water in abundance poured upon it: let it be very well ſtirred about in the Water with a new Birch Broom, and this repeated ſeveral Times with freſh Waters, till all the Blackneſs is got off, and the Wheat looks like other Corn, only for the Wetneſs. Then ſpread it upon Sheets, or any other cleanly Way, to dry in the Sun, and turn it from time to time till it be dried perfectly; after which it will be fit for Uſe.

This is by no Means to be uſed as Seed Wheat, that we have ſhewn before, for the leaſt Remains of the Smut would endanger the new Crop; but provided the worſt of it have been carefully picked out firſt, there will be no Harm in the uſing it for Bread, or any other Purpoſe.

We have obſerved that Wheat, where ſmutted to a great Degree, is unwholeſome; and indeed in that Caſe it ſhould not be eaten; but when the Defect has been moderate, and the worſt is picked out, the Remainder may be eaten without Danger.

In ſome Places they have a Way of ſoaking their Wheat in Water for ſeveral Hours, in order to get off the Blackneſs, by rubbing it afterwards in the Water; but when Corn is ſo bad as to require this, it is, honeſtly ſpeaking, too bad to uſe.

In this Caſe, as the Water has penetrated the very Body of the Grain, the Sun and Air will not be enough to dry it. They for that Reaſon put it to dry in a Kiln, in the Manner of Malt, and afterwards ſell it; but this every one ſhould be guarded againſt, not only with Reſpect of ſowing, but for the common Service, as the Bread of Families.

In Reſpect of Seed Corn that ſhould be of the choiceſt and pureſt Kind of all, ſo that any Impoſition upon the Farmer in the ſelling for that Purpoſe, is cruel in the higheſt Degree. When he is obliged to buy his Seed Corn, he muſt be very nice in the Examination of it; and he may diſcover whether any Trick of this Kind, more or leſs, have been play'd with it, by the Sight and Taſte. Fine and perfect Wheat ſhould look ſhining, and all of a Colour; if it be dim on the Surface, or of different Hues in the ſeveral Grains, it is to be ſuſpected. The ſweet Taſte of good Wheat is alſo very well known to the Farmer, and no Art can give this to ſuch as has been waſhed or otherwiſe managed to hide its Faults.

In Flanders they go farther than the late named Practice in the clearing of their Wheat that has been ſmutted; they have a large hollow Machine, made of Plates of Tin ſet in a wooden Frame. Theſe Plates are all pierced full of Holes inward, ſo that the Inſide is in all Reſpects like the rough Face of a Nutmeg-grater. When their Corn is ſmutty in any great Degree, they firſt ſteep and waſh it very carefully in Water, and then, when it is ſomewhat dried, they put it into this Machine and work and ſhake it about; the Conſequence is, that the black Spots are in Part grated off, and in Part concealed; and this, though none can be deceived in it, ſo far as to buy it for Seed Corn, is ſold for Bread, and is often the Occaſion of great Diſorders.

Our Cuſtom of picking out the worſt Ears firſt, takes away the Neceſſity of any ſuch Contrivance for the rubbing the Grains down; but in general, when it is ſo bad as to require this, the Farmer has more Occaſion to blame himſelf than any thing in the Seaſon.

The great Article in order to prevent the Miſchief, is the uſing a proper Kind of Manure, and a due Quantity of it, with a due Degree of Tillage. And we may be led, by farther Examination of the ſeveral Places where particular Manures are uſed, to know which agree beſt and which worſt, with the Intention of preventing Smut. A great deal we have done in this Matter, by examining the Crops in ſuch Places as we have had Opportunities to viſit; and by making Enquiry by Letter in others: but it would be of the utmoſt Service to the Improvement of this uſeful Study, if thoſe who have Judgment and Experience in the ſeveral remote Countries, would communicate their Knowledge for their mutual Benefit. The Proprietors of this Work will be very glad to be inſtrumental to ſo general a Good, and as it is now drawing toward a Concluſion, they take this Opportunity of offering their Service, and ours the Compilers of it, to review and prepare for the Publick Service any Papers or Letters which ſhall be directed to them, containing any Branch of uſeful Knowledge.

Having thus gone through the Care of the Land, and Management of a Crop under every Circumſtance, nothing remains for the compleating this Part of our Work, but the informing the Farmer how he may beſt preſerve his Corn when he has reap'd and thraſh'd it; and this we ſhall give in the Words of a Correſpondent, to whom we have been often before obliged on the moſt intereſting Occaſions, and whoſe Diſcoveries and Improvements on this Head demand the Thanks of the Publick, more than the Labours of moſt other Enquirers.

A DESCRIPTION OF A Ventilating Granary,

For the Preſervation of Corn in a State of Reſt; with the Plan and Conſtruction of it: Alſo, ſome Obſervations and Directions about ſound, and tainted or ill-ſaved Wheat, with Reſpect to their Preſervation in this Kind of Granary.

Principles upon which this Granary is built.

AIR, conſequently Dryneſs and Coolneſs, duly adminiſtered together, with ſufficient Security againſt Vermin, ſeem to be the Eſſentials neceſſary to the moſt convenient Methods of preſerving Corn, for all its Uſes, for ſeveral Years together in a Granary or Magazine, without ſtirring.

N. B. A Granary or Magazine, on theſe Principles, ſhould not be built in a confined Situation; as, near the Shade or Shelter of Trees or Buildings, but where the oppoſite Eaſt and Weſt Sides of ſuch Granary may be properly expoſed to thoſe Points: in which Caſe moſt of the intermediate Points between them and the North and South, will act upon this Granary more or leſs, according to the Velocity of the Wind, by fixing the Folding-Doors thereof properly, at ſuch Times when the Corn is to be ventilated.

References to the Plan.

Plate 1. Elevation of the Granary or Magazine to be built of Brick or Stone, of various Dimenſions, according to the Occaſions of the Owner; but here (as a Specimen) only 46 Feet long by 17 broad, from Out to Out.

Pl. 2. Section of the Granary Lengthways through the Middle.

B. B. B. B. The Garret, all in one Chamber, into which the Corn may be received by Means of a Crane or Pully fixed over the Door (k) (Plate 1) on the North Gable of the Building; to which Door a Ladder, or Flight of Stairs on the Outside of the said Gable may communicate. This Garret may occasionally be made Use of as a Store Room for Corn, that has already been preserved two or three Years in the Chambers below, marked (C. C. C.) or for other Kinds of dry Goods, leaving a few Air Holes only in the Gable Ends of this Garret Story.

C. C. C. Three Chambers where the Corn is to be first reposited, in order to receive the necessary Ventilations for a Year or two, or more, till perfectly cured or sold; each Chamber here, about 13 Feet square, by 12 high; to be divided from each other by Brick Partitions (m. m.) carried up from the Ground. The Sides of these Chambers to be neatly covered with Stucco Plaister.

G. G. G. The Floors of these Chambers, to be supported with whole double Deals laid Edgeways, and covered with narrow Deal Boards, not exceeding six Inches in Breadth, leaving a Space of near an Inch between each Board, that Room may be given for the Air to ascend equally through these several Interstices in the Floors, in order to ventilate the Corn contained in these Chambers, as Occasion requires. (vid. Plate 3. Fig. 1.) These Floors, or at least the Interstices between the Boards, to be covered with close Wire Grating, that will not admit the Grain to pass through; or the Floors may be covered intirely with a proper thin, but strong Hair Cloth, nailed down round the Confines of the Floors, before the Corn is lodged.

G. G. G. Small Trap Doors (vid. Pl. 3. Fig. 1.) to be made a Foot square each, one in the Center of each Floor; which may be opened occasionally, to let out the Corn into the Ground Chambers for Use or Sale; and may at such Times, if a brisk Wind sets in and through the Ground Chambers, prove a good Winnowing to such Corn to prepare it for Market, especially if the said Trap Doors be humoured by the Hand, so as to let fall the Stream of Corn thin and diffused on the clean Ground Floors. These Trap Doors to be free from Wire Grating or Hair Cloth over their Dimensions; to be affixed by Hinges, so as to open into the Ground Chambers; at other Times kept fastened with a cross Iron Bar Staple and Pad-Lock, to prevent Imbezelment. The Ceilings of the Chambers C. C. C. must be made as much Air Proof as may be, either by some excellent close Plaister Ceiling, or only by caulking the Joints in the Garret Floor above, pitching the Seams afterwards, and dashing drift Sand on the Seams after the hot Pitch Brush, by which Means no Air can pass out of the Chambers C. C. C. except through the Flues (L. L. L.).

L. L. L. The Flues, to be made of a Piramidal Figure, with Beams erected at the four Angles of each Flue, well barred and braced together, and covered with Laths and Plaister, so as to be tight and Air-Proof; to be four Feet square each at their Bases, and well fixed in the Garret Floor, and to the Roof Timbers; to be erected directly over the Trap Doors (G. G. G.) and elevated twelve or fourteen Feet above the Ridge of the Roof of the Building; their Openings at their Tops to be a Foot square each; a Piece of Brass Net-Grating to be fixed half an Inch within their Muzzles, to prevent Sparrows or other Annoyances descending to the Corn below, and also to admit of a Cover or Valve, falling close on their Muzzles. These Muzzles to be well guarded from Rain and Snow by proper Umbrelloes, elevated a little above them, and well fixed to the Continuation of the four Beams of the Flues. The Valves just mentioned to be made of square Pieces of Oak Board, exceeding the square Dimensions of the Orifices of the Flues, by two Inches on every Side; a Plate of Lead of five or six Pound weight, to be nailed on the Top of each Valve; the Valves underneath to be lined with Buff, well soaked in Pickle, to attract the Moisture of the Air, swell and stop close. These Valves to open or shut by Means of a small Cord, fastened to a very short cross Sling of the like Cord, which cross Sling communicates, and is made fast to four Staples in the four Corners of each Valve; that the Valves may be raised and lowered evenly on their respective Muzzles, by Means of the small Cord passing over a Pully fixed under the Center of the Umbrello, and down between the Lath and Plaister; and the boarded Lining of the Flue comes out to hand in the Garret, through a small Hole in one Side of the Flue, which Hole should be made through a Piece of Wood fixed in the Framing of the Flue; and the upper Edge of the said Hole, on the Inside of the Flue, should be guarded by a small Roller of Wood, to ease the Friction of the Cord upon drawing up the Valve, and keeping it in that Situation by a Weight somewhat superior to that of the Valve itself, hung to the Cord End in the Garret, or the Cord may be made fast to a Hook in the Garret Floor, making Allowance for the lengthening and shortening of the Cord by the Weather, that it may not be in danger of breaking; these Valves or Covers should also be guided in their raising and lowering, by four fixed upright smooth wooden Bars, which may lodge them equally on the Squares of their respective Flue Mouths. These Valves or Covers might be contrived to be opened and shut by other Methods, but this seems to be one of the most simple, and least liable to Disorders and Repairs. The chief Use of these Valves (and a very considerable one) is the keeping out the moist foggy Air from descending upon the Corn, when the Granary is not to be ventilated.

i. i. i. Trap Doors in the Garret Floor, for laying in the Corn into the Chambers C. C. C. to be two Foot and half square each, well fitted to their receiving Jambs, and made tight with Clay well tempered with Salt and Water, after the Chambers are charged with Corn.

D. D. D. The Ground, or lowest Chambers that should be admitted in a Building of this Nature, the Sides of which to be smooth plaistered, that Rats or Mice may not be able to ascend to the Corn Floor, nor should any Goods or Lumber be admitted into these Ground Chambers, because they would diminish the Diameter

of the Quantity of Air to be admitted into them, and conſequently of its Weight and Preſſure neceſſary to force its Way up through the Interſtices left in the Corn Floors, as before deſcribed.

E.E.E. Large folding Doors to each Ground Chamber, opening outwards, which when ſet open and properly fixed may catch the drying Side Winds, and direct them into their reſpective Chambers. The like folding Doors to be on each Side of the Building, Eaſt and Weſt, oppoſite to each other, ſo that upon ventilating the Corn above, the Windward Doors only are to be opened; at all other Times, when moiſt Weather prevails, all the Doors, as well as the Valves before-mentioned, to be kept ſhut and cloſe as poſſible; for which Reaſon theſe folding Doors are to be truly fitted to their Jambs, as alſo to their upright center Poſts where they meet, bolt and lock, or by a ſtrong croſs Bar and Pad-Lock on their Outſide; and the Borders of theſe Doors, at all their Meetings on the Inſide, ſhould have a Liſt of Buff nailed round them with Sprigs, in order to prevent an Indraught of moiſt and foggy Air, as much as poſſible.

Mice and other groſs Vermin, will find great if not inſuperable Difficulty, to get Admittance into this Granary; and Inſects infeſting it, may be deſtroyed by Brimſtone ſet on Fire occaſionally in the Ground Chambers, keeping the folding Doors, as well as the Valves above, cloſe ſhut at ſuch Times of ſtoving, and it ſhould be well ſtoved before it be repleniſhed with Corn.

It is ſufficient only to remind many People, that the Acid Fume of Brimſtone confined, kills all Inſects within its Circulation, and no Doubt diſcourages their Approach for ſome Time after; and may probably tend to abate Fermentation in the Grain, which is generally, if not always, occaſioned by ſuperabundant Moiſture and Heat.

Reasons *offered for the Operation and Effects of this* Ventilating Granary.

When the dry ponderous Air is directed into the Ground Chambers by their folding Doors, and ſtrongly preſſed in by the continued impelling Force of its own Current; being there accumulated, it will endeavour to expand itſelf on every Side, by its own elaſtick Spring: and ſo paſſing through the Interſtices, before-mentioned, in the Floor above it, as the leaſt reſiſting Vents will inſinuate itſelf through the Wire Grating or Hair Cloth, into the numerous Interſtices between the Grains of Corn; through which its Motion will be greatly expedited by Means of the Flues above, when open; as the Air at their Tops being above forty Feet from the Ground, will be much rarer than in the Ground Chambers below, where it will be greatly condenſed by the Preſſure of the ſuperincumbent Atmoſphere, and alſo by the impelling Wind or Current of Air continually driven into the loweſt Chambers. The Air therefore, always endeavouring to expand itſelf in the loweſt Chambers, to thoſe Parts where it finds leaſt Preſſure and Reſiſtance, will continually tend from the loweſt Parts upwards, and ſo produce an adequate Circulation of Air through the whole Bulk of Corn, whereby it will be ventilated and kept cool, dry, and ſweet, though in a State of Reſt, for ſeveral Years together, and longer than the private Owner ſhould lie out of his Money.

Farther Obſervations on the Uſefulneſs of this Kind of Granary.

In this Kind of Granary, Wheat may be lodged in Bulk ten or twelve Feet ſquare every Way, or whatever the ſquare Contents of the Corn Chambers be, the Wheat may lie therein within a Foot, or half a Foot of the Ceiling, but half a Foot is a good Diſtance at firſt laying in the Corn, for it will ſoon ſink lower as it dries. This is a vaſt Advantage in Stowage over the old Granaries, where they dare not lay the Wheat, for a long Time after laying it in, above eighteen or twenty-four Inches deep, and that too, frequently turned and aired by Hand-Labour and Expence, for Fear of its heating, muſting, and breeding the Wevil; whereas this Kind of Granary, ventilated as it were, per ſe, and in a Manner without any Trouble or Expence attending it, will preſerve at leaſt five Times the Quantity of Wheat upon every Foot of its Flooring, more than the old-faſhioned Granaries can do.

N. B. The Ground Chambers need not be above ſeven Feet high, under the Floor Timbers; and a Brick Floor, or one of Clay, Lime, and Smiths Duſt well tempered together, is fitteſt for the Ground Floor.

In large Military or Publick Magazines, greater Bulks of Corn may be ſupported by upright Props under the Floors, and the Ventilation proportioned by adding more Flues to each Corn Chamber, and proportioning the Dimenſion of the folding Doors thereto, or the Number of them.

The Author having never ſeen or heard of any Granary of this Kind in Practice, ſubmits it to publick Scrutiny, Cenſure, or Improvement.

The Diſtinction and Difference between ſound and tainted or damaged Wheat, and their different Treatments in Order to their Preſervation in this Kind of Granary.

If Wheat be dry and well ſaved at Harveſt, free from black, blighted, or ſooty Ears, has afterwards had its due Sweat and Melioration in Rick, Cock, or Barn, for five or ſix Months, and after threſhing out has been well cleanſed and ſcreened; ſuch Wheat may truly be called ſound, and when lodged in this Kind of Granary, may be eaſily preſerved therein for many Years, by ordinary and moderate Ventilations.

For Inſtance, being thraſhed out in January or February after reaping, well cleanſed, and lodged in this Granary; it may be ventilated once a Week, if Opportunity offers, for the firſt two or three Months in Spring, which will be a great Advantage to the Grain, before the ſultry Heats of Summer come on, when it ſhould be ventilated as often as a proper Breeze or Gale of Wind offers, and once a Month, a few Matches of Brimſtone ſet on Fire in the Ground Chambers, as before directed; in the Autumn, the Winter, and Spring following, two or three Times a Month may be ſufficient to ventilate, without applying the Brimſtone Fumes; but the ſecond Summer ventilate twice or thrice a Month, and apply

apply the Fumes once or twice during this ſecond Summer; after which Time it may be ſufficient to ventilate once a Month during the ſecond Autumn, Winter, and Spring, and twice a Month during the third Summer, when it may be ſaid to be thoroughly cured.

It may not be amiſs, during the firſt Year or two after the Wheat is lodged in this Granary, to inſpect the Condition of the Corn, by opening the Trap Doors in the Garret Floor, eſpecially in Summer Time once or twice; for as Moiſture or Vapour of the Corn will always riſe to the Surface of the Bulk, though the Center may be dry, ſo the Appearance of the Surface, as to Moiſture or Dryneſs, may regulate the Number of Ventilations neceſſary for its Preſervation.

It is certain from Experience, that ſound Corn that has been well preſerved in common Granaries, by frequent Turnings and Winnowings, and afterwards laid two or three Foot deep, or more, ſeldom ſweats, gives, or ferments after the firſt two Years, except it receive accidental Wet or Moiſture, from which it is eaſily freed with a little Care; whereas it is a long Time parting with its natural internal Moiſture, which is the greateſt Enemy to its Preſervation.

It is no leſs certain that Wheat, being well preſerved by any Method whatſoever, has, after ſeveral Years ſo kept, been found to produce more and better Flour for Bread, than ſome of the ſame Field and Crop did ſoon after its being threſhed out; becauſe the aqueous Humidity of the Grain evaporating by keeping ſome Years, the Flour comes cleaner from its thin Bran under the Stone.

It is equally certain, that Wheat ſo preſerved for ſeveral Years, has proved very good Seed Corn, and probably not ſo liable to produce the ſmutty Ear; Exceſs of Moiſture, either in the Seed, the Soil, or the Seaſons, being the chief Cauſe of that grievous Complaint, except the Seed itſelf be ſmutty, and then the Crop alſo will be ſmutty notwithſtanding dry Seaſons.

But if Wheat has been ill-ſaved at Harveſt, or be in a contrary Condition, in any or all Reſpects, to the ſound Wheat deſcribed above, which would certainly give it a ſtrong Tendency to Heat and Fermentation, in a Bulk of ten or twelve Feet deep, and ſo induce the Wevil, and other Maladies, to the further Damage or Deſtruction of the Wheat. It will therefore, in this Caſe, be neceſſary firſt to cleanſe well by Screen or Tryer, after which give it a very gentle and ſlow drying upon a Kiln, equal only to a ſtrong Sun Heat, till the Grain be ſomewhat hard under the Teeth; then laying it on a Floor to cool, for ſome Hours, put it into Sacks half filled and tied faſt, and ſo rub the Wheat well therein on a ſmooth Floor with both Hands, frequently turning the Sacks over every Way, in order to looſen and free the Grain from its black ſooty Duſt; then winnow clean, after which it may be laid into this Granary ten or twelve Feet deep, and there treated in every Reſpect like Wheat originally ſound.

Such Wheat, after ſuch Treatment, will turn out much better for Bread, though kept two or three Years or more in this Granary, and ſell for a good deal more Money than it would have fetched in its firſt tainted and foul Condition.

Yet ſuch Wheat, though by this Method made proper for Bread, ſhould by no Means be uſed for Seed; for Kiln-drying, more or leſs, abates or deſtroys its vegetative Quality; and even without drying, a diſtempered Seed ſeldom or never fails of producing a diſtempered Crop.

J. S.

End of the Twelfth Book.

A COMPLEAT BODY OF HUSBANDRY.

BOOK XIII.

Of the Diſeaſes of Cattle, and their Remedies. In FIVE SECTIONS.

SECT. I. *Of HORSES.*

The INTRODUCTION.

WE have thus, according to the Courſe and Method marked out in our Plan, gone thro' every Article of the Farmer's Concern reſpecting the Choice of his Cattle for Stock; and the Growth and Management of every uſeful Plant that he ſhall have Occaſion to cultivate. We come now to conſider thoſe Diſorders to which the ſeveral Kinds of Cattle are liable, the Methods of guarding againſt them, and the Medicines moſt approved in their Cure.

We have had Occaſion to obſerve, on many Occaſions, how greatly the Farmer is miſ-led by thoſe who ſhould give him Information in reſpect of the Management of his Crops; but this is an Article leſs underſtood, and more injudiciouſly treated than any other; and it is, at the ſame Time, of the greateſt Concern. The Loſs of his Cattle is not to be recruited but

at a very conſiderable Expence; and the Care of them is, in general, committed to Perſons ſo very ignorant, that little better than their abſolute Loſs can be expected when they fall into any conſiderable Diſorder. They muſt have Strength indeed, and good Luck into the Bargain, if they can eſcape from their Diſeaſes and ſuch Doctors.

Unhappily, while thoſe Perſons who undertake the Cure of theſe Creatures are ſo ill qualified to ſucceed in it, the Farmer himſelf is leſs able to judge right, than they are to act. It is a Part of needful Knowledge fartheſt of all removed from his Enquiries, and he is obliged to ſubmit to every thing.

A few Names of Diſorders got by Rote, are generally the whole Stock of the Country Leeches Knowledge, and theſe he applies at Random to any Diſorder that comes before him, boldly, becauſe he knows none can contradict him.

A ſmaller Store of Remedies ſerves his Purpoſe, than of Names for the Diſorders; for theſe are People who, like the advertiſing Doctors, cure many Diſeaſes with one Medicine. Their Phyſic they uſe as much at Random as the Names of Diſorders; and the unhappy Farmer is ſtripped both of his Cattle and his Money by their Ignorance. If they deſtroy the Beaſt, which would, if let alone, have of itſelf recovered, he is perſuaded the Violence of the Diſorder killed it; and ſatisfies his Mind that he has done all he could.

This is the Condition of the Knowledge Country Pretenders, in general, have of the Diſeaſes of Cattle: 'tis impoſſible to repreſent it worſe than it is; but from this Condition of Ignorance we hope to reſtore it in the ſucceeding Chapters.

We ſhall inſert in them nothing but what is the Reſult of Experience. We ſhall inform the Owner what he may do for his Cattle himſelf, and lay down ſuch plain Rules for the Conduct of others, that he will be able to know whether they act according to Reaſon and Knowledge.

If the Practitioners will ſtudy in the ſame Pages, we promiſe them, they will find only Truth and what Experience confirm: we requeſt them to peruſe 'em carefully, not only for the Farmers Sakes, but their own; and hope they will conſider the Harſhneſs of what we have been obliged to ſay, as no more than a juſt Repreſentation of their Need for better Information: 'tis one of thoſe Wounds that is neceſſary to be opened deep, in order to reach the Cauſe of the Malady; and they know theſe ſoon heal when proper Methods are followed.

The Freedom we have taken with their Profeſſion, is to let the Farmer into his Danger, in repoſing too much Confidence in their Knowledge; for it is for his Service we are writing: at the ſame Time we ſhall obſerve, that there are many particular Practitioners of more Knowledge; and to theſe we refer what we ſhall publiſh on the Subject, deſiring them to be Judges between us and their more ignorant Brethren, whether they do not deſerve all we have told the Farmer concerning them by their raſh Practice, and whether what we ſhall propoſe to them be not founded on the true Principles of the Art. We write for real Uſe, and have no Reſpect of Perſons.

The Horſe is the moſt valuable Creature in the Farmer's Stock, both with Reſpect to his Price and his Uſe. The whole Care of chuſing, managing, and breeding this Animal, we have delivered in a preceding Part; but, in this Place, he claims a very particular Regard, both for the frequent Diſorders to which he is liable, and the familiar and eaſy Methods by which the far greater Part of them may be remedied, when they are rightly underſtood.

We ſhall give Directions for preparing the ſeveral Kinds of Medicines uſeful on ordinary Occaſions; and we ſhall alſo enter upon the worſt Diſeaſes to which he is ſubject, not contenting ourſelves, in the cuſtomary Way, with ſetting down the Name of the Diſeaſe, and then the Remedy for it; but explaining what it is, before we give Directions what ſhould be done to cure it. Without this, all that can be written is uſeleſs; and this has been the Reaſon that from what has hitherto been publiſhed on this Matter, ſo little Good has accrued, or ſo ſmall a Share of Knowledge has been communicated either to the Farrier or the Farmer.

CHAP. I.

Of the Glanders.

WE have taken for the firſt Conſideration, under the Article of the Diſeaſes of Horſes, this which is the moſt important of them all, and, in general, the leaſt underſtood.

Many have called it incurable; and indeed, according to the old Practice, it muſt have been ſo: for if ever a Horſe recovered under that Management, Nature muſt have performed the Cure: it is impoſſible they ſhould ſo much as have aſſiſted in it, who knew nothing of the Seat and Nature of the Diſeaſe.

Of late Years ſome Perſons of Skill have undertaken the Cure of Horſes; Anatomy has been called in to aſſiſt in the Operations; and Diſſections made of morbid Bodies of that Animal, to ſhew the Cauſe, Situation, and Nature of their Diſeaſes.

From this rational Method of Study, we have been made acquainted with the Origin and true Nature of the Diſorders of theſe Creatures, and thence may proceed properly to the Cure.

With Reſpect to the Glanders, this was more wanted than in Regard of any other Diſorder; and it is but very lately we have attained the Knowledge. A Farrier to the King's Stables in Paris, his Name Lafosse, made the Diſcovery; and the Royal Academy of Sciences received and adopted it. This is the true Road to Knowledge; when the moſt honourable Aſſemblies will receive and give their Sanction to Truth, from every Hand that offers it; and do Honour to any one who can do Service to the Public.

CHAP. II.

Of the miſtaken Notions concerning the Glanders.

THE Glanders is a Diſorder ſo well known, that it may ſeem ſuperfluous to give any Account of its Appearance; but nothing is leſs underſtood, in general, than its Cauſe.

It is a Running at the Noſtrils. Firſt there is a whitiſh Liquor diſcharged; afterwards, as the Diſeaſe gathers Strength, a browniſh Matter; and, laſt of all, a bloody Water.

All theſe are voided in very great Quantities, ſo that the Horſe is offenſive to the Sight, and the Diſcharge waſtes him continually.

This is the Diſeaſe called the Glanders, which has deſtroyed Thouſands of Horſes; and from which very few have eſcaped that were once ſeized with it: not that the Diſorder is incurable, but that from a univerſal Miſtake, concerning its Nature, none knew how to go about to cure it.

The Reader will be aſtoniſhed, that among ſo many Conjectures as have been made about this Diſeaſe, none came near the right; and that People ſhould ſearch in the remoteſt Parts of the Body for the Seat of a Diſorder, which all the Time was ſituated where it appeared.

The various Opinions that have been advanced concerning the Origin and Nature of the Diſeaſe, have occaſioned various and almoſt innumerable Methods of treating it to be propoſed, and theſe Opinions being all erroneous as to the Cauſe, it is no Wonder that not one Horſe was ever cured by the Methods eſtabliſhed on thoſe Principles. Where the Truth is not known, wrong Gueſſes are endleſs; and all that is founded upon them muſt be alſo erroneous.

The oldeſt Authors on theſe Subjects, ſuppoſed the Seat of the Diſorder to lie in the Brain; and they imagined that, at laſt, the Brains themſelves run out thro' the Noſtrils, and to that attributed the Death of the Creatures: miſtaken and erroneous as ſuch an Opinion was, theſe were got nearer the Place of the Diſorder than many who followed.

The next Conjecture was, that the Diſeaſe lay in the Back-Bone; and that the Diſcharge thro' the Noſe proceeded from the Marrow of that Part. This was a received Opinion many Years among our Farriers, and is ſo, in moſt Places, to this Day; from whence they call the Diſorder, The Mourning of the Chine.

Later Authors have ſuppoſed the Diſeaſe to be in the Liver, ſome in the Lungs, ſome in the Kidneys, and others in the Spleen: to all theſe proper Remedies have been propoſed; and the Glanders has been attempted to be cured by Diuretics and Deobſtruents.

Mr. Solleysel, an Author of great Credit, adopts all theſe Parts as poſſible Seats of the Diſorder; and traces the Matter by Way of the Cæliac Vein, up to the Head, where he ſuppoſes it is lodged upon the Parotid Glands, and thence diſcharged through the Noſtrils. This appeared ſo learned, that it was ſuppoſed it muſt be true: People are always ready to reverence what they do not underſtand; and the Farrier and the Farmer thought nothing could be a Secret to a Man who could uſe ſo many Words they never heard before. On this was founded a Practice for the Cure, which, like the reſt, was as ineffectual as the Syſtem was erroneous.

After this, the Lungs were conſidered as the Seat of the Diſorder. Others attributed it to Knots and Swellings under the Caul: the Authors of the Dictionary of Trevaux, adopt the former of theſe Opinions; and the latter is found among the Syſtems in our Mr. Chambers.

We have named theſe ſeveral Opinions, to tell the Farmer that they are erroneous. Experience, Diſſections, and certain Obſervations, have ſhewn they are falſe: let him therefore take Care that he is not miſ-led by them, and that he place no Dependance upon the Methods of Cure founded upon them.

In general, all internal Medicines are uſeleſs in this Caſe. The Horſe may have a bad State of Blood at that Time, and this may render the Cure, in the Method here to be propoſed, more difficult. In this Caſe, the common Sweetners of the Blood may be properly given at the Time he is under Cure; ſuch as Brimſtone and Antimony among his Corn, but otherwiſe they are not wanted.

CHAP. III.

Of the real Situation and Cauſe of the Glanders.

AFTER all that has been written plainly or pompouſly, learnedly or ignorantly, on this Subject, it is plain from obſerving the Nature and Progreſs of the Diſorder, and from the fruitleſs Attempts founded on theſe Opinions to remedy it, that the Cauſe does not lie either in the Brain or the Back-Bone, the Liver or the Lungs, the Spleen or the Kidneys.

Anatomy, Obſervation, and a certain and regular Method of Cure, founded upon thoſe Experiments and Obſervations, prove that the Seat of the Diſorder is where it appears; that no Part of the Creature is affected but the Noſtrils; and that the Diſeaſe really lies in the Glands, which are ſituated in the thin Skin that covers their Inſide.

When the Glanders are only in one of the Noſtrils, a ſtrict Examination ſhews that the Gland, or, as Farriers call it, the Kernel, which lies near the Jaw-Bone on the ſame Side, is found to be ſwelled and inflamed, and not that on the other Side; but as ſoon as both Noſtrils run, then both theſe Kernels are found to be ſwelled in the ſame Manner.

This Diſorder may very naturally proceed from a Cold, without the Blood's being at all concerned in it; though it may happen, in other Caſes, that the Blood is bad at the ſame Time, and then the Diſeaſe will be more difficult to cure.

When theſe Kernels are inflamed, the Running at the Noſe comes on, and this is the firſt and gentleſt

gentleſt Stage of the Diſorder. The Horſe's holding down his Head to feed, and its natural Situation, combine to increaſe this Running; and thus a Diſorder is begun in a natural Way, and continued by natural Means, which is generally ſtrengthning itſelf, while the Farriers are attempting its Cure by Drenches; not one of which can poſſibly have the leaſt Effect upon it, becauſe they are levelled at an imaginary Cauſe.

For the Satisfaction of thoſe who would not part with the Opinion of the Glanders proceeding from Diſorders of the Lungs and Spleen, or the Liver and Kidneys, all theſe Parts have been examined by Diſſection, in Horſes that have died with the Diſorder upon them in its utmoſt Violence, and they have been found all ſound: therefore it is plain they have no Share in the Cauſe: it lies wholly, as we have ſhewn, in the Parts where it appears. It may come from a ſimple Cold in the Horſe, without any other Diſorder to cauſe it; tho' it may alſo, in ſome Inſtances, be occaſioned by the Matter of a Diſeaſe falling upon that Part; or be rendered worſe by a bad State of the Blood. In theſe, which are particular Caſes, the Method of Cure is however to be the ſame with the ſmall Allowances we have made already on that Head, of a bad State of the Blood; as to the other Caſe, it requires no particular Conſideration; for though a Diſorder of another Kind may have been the Cauſe of the Glanders, by ſettling on that Part, yet, when once ſettled there, it is the ſame as if the Glanders had come in a natural Way; and the ſame Method will prove a Remedy.

To explain the Seat and Nature of the Diſorder perfectly to the Farmer, we are to inform him, that there is a thin Skin which lines every Part of the Noſtrils of a Horſe. This is the Seat of the Glanders. He will obſerve in the Noſe of a Horſe, a Partition going all along the Inſide, which divides it into two Parts, or the two Noſtrils. This Partition is covered in every Part with the Skin we have named: it is thin, ſoft and tender; and in it there are many ſmall Kernels. Theſe ſeparate a ſoft Moiſture for rendering the Skin ſupple and ſenſible; and this is all they are to do in their natural State; the Abundance of their Diſcharge being a trifling Thing, and thrown off without Offence: but theſe Kernels will, by being diſordered, ſeparate a larger Quantity of a fouler Matter, and this is the Glanders.

On each Side of the Partition which divides the two Noſtrils, there are large Holes or Cavities. The ſame Skin which covers the Partition itſelf, is alſo continued to them, and forms a Covering to their Bottoms and Sides; but in this Part, the Kernels are fewer and ſmaller than elſewhere, and they only ſeparate a very ſmall Portion of the Moiſture for juſt keeping the Skin there ſoft.

This is a very happy Proviſion of Nature; becauſe the loweſt and innermoſt Parts of theſe Hollows are ſo deep and winding, that if any Redundance of the Matter had been ſeparated there, it could not have been diſcharged as in the other Parts; and Nature would have been loaded and obſtructed by the remaining of it upon the Place.

The Skull of a Horſe is compoſed of ſeveral Parts; and in that Piece which forms the Forehead, juſt above the Place of the Eyes, there is a Space or Gap between the two Plates of the Bone: theſe make what are called the frontal Sinus's; but the Farmer, without troubling himſelf with remembring ſuch Names, will underſtand that there are ſuch Cavities; and this will be enough for his Purpoſe.

Theſe Cavities are covered throughout on the Inſide with this ſame Skin, which covers the Partition of the Noſtrils; and it has in this Part the ſame Sort of Kernels as elſewhere.

All this Skin, and all the Kernels in it, are the Seat of the Glanders. In the Beginning, the Kernels only ſwell, and diſcharge a great deal too much Matter; and theſe in the Hollows of the Forehead-Bone moſt of all. They are therefore the main Seat of the Diſeaſe. When it becomes more violent, they are ulcerated or grow full of little Sores; then they diſcharge a more offenſive Matter; and at length the whole Skin of this Part is enflamed, ſwelled, and eaten to Pieces, and then comes the Diſcharge of a bloody Matter.

This is no fancyful Suppoſition, but is the exact and real Fact found by Examination.

When the Head of a Horſe, violently affected with the Glanders, is opened, not only the Kernels are found to be ſwelled and ſore, but all this Skin is full of Ulcers; and it is ſeen to be grown much thicker than naturally, and fuller of Blood-Veſſels; and theſe are eaten to Pieces at their Ends. From theſe flows the Blood, and from the ulcerated Glands the Matter, which are ſeen to come from the Noſtrils of the Horſe in this Diſorder; and this is the true Nature and Cauſe of the Diſcharge: the Glanders is nothing but this, extending itſelf over every Part.

We have told the Farmer of the natural Hollows there are on each Side of the Partition of the Noſtrils; and have obſerved, that Nature, in a State of Health, occaſions ſo little of the natural Liquor of the Kernels to be ſeparated here, that it ſerves only to moiſten the Skin, becauſe if more were ſeparated there, as in other Parts, it could not be diſcharged, and would be a Burthen to her. This Miſchief happens in the Caſe of the Glanders.

The Kernels in theſe Cavities are diſordered like the reſt; they grow ulcerated, and they diſcharge a great deal of Matter, which lodges, againſt the Intent of Nature, in theſe Hollows, and they are found full of it in a very offenſive Condition, on the diſſecting the Heads of Horſes dead with this Diſeaſe.

In the ſame Manner alſo, the Kernels which are in that Part of the Skin which lines the Sides of the Hollow in the Forehead-Bone, grow ſwelled, enlarged, enflamed, and ulcerated; and the Skin itſelf grows thick, raw, and bloody. All this joins to confirm the Truth of that Syſtem, which places the Seat of the Glanders in this Skin, or Lining of the Noſtrils and its Glands, and declares it not to be in the Liver or elſewhere; becauſe in all Diſſections of Horſes dead

dead with the Glanders, this Skin and its Kernels are found thus ſwelled, inflamed and ulcerated, and the Entrails are, as we have ſaid, at the ſame Time found perfectly ſound and good; unleſs when the Creature has had ſome other Malady beſide.

Theſe Hollows of the Forehead Bone in Horſes dead with the Diſorder, are found, like thoſe by the Side of the Partition, full of thick offenſive Matter: and the Change in the Skin itſelf is greater here than in any other Part. In a Horſe that has died without the Glanders, this Skin upon Diſſection is found to be thin, fine and ſoft, and there is never ſeen in it any Blood Veſſel: doubtleſs there are ſuch, though too ſmall to be perceived by the Eye; but in this Caſe of a Horſe dead with the Glanders, the Skin in this Part is thick, hard, and inflamed; and there are Blood Veſſels ſeen all over it, with their Sides and Ends eaten to Pieces. In each Noſtril are two Subſtances rolled up like Horns, and in the ſame Manner covered with the Skin which covers the Partition, and lines the Cavities; and in this Part this Skin is in the ſame Manner found to be enflamed, thickened, full of Blood Veſſels, and ulcerated.

By this it is plain, that as the Skin we have deſcribed is the real Seat of the Glanders, ſo it is univerſally affected by that Diſeaſe whenever it appears, and no Part of it eſcapes.

The Diſeaſe firſt ſhews itſelf in thoſe Parts of this Skin where the Kernels are biggeſt, and this is particularly the Caſe in the Hollows of the Forehead Bone; ſo that they may be called in a particular Manner the Seat of the Diſorder: but it purſues its Courſe through the whole Extent of that Membrane.

It is in general much the ſame Structure that we find upon Diſſection in the Head of a Horſe, and in that of one of our own Species: but there is a particular Difference in thoſe Glands or Kernels we have mentioned under the Jaw Bone, which one by one ſwell, as the Diſeaſe affects firſt one, and then the other Noſtril.

There are the ſame Glands or Kernels in Men, and Anatomiſts call them the Sublingual Glands: but it is particular, that in Men they open into the Hollow of the Mouth; ſo that whatever they diſcharge is ſpit out, or otherwiſe managed as the Spittle: but in Horſes they do not open into the Mouth, but turn backwards, and paſs behind the Holes of the Noſtrils.

The Mouth in Mankind is in a great Degree moiſtened by theſe Glands; and to ſupply that Office in Horſes, as theſe have their Opening turned another Way, there are innumerable ſmall Kernels all over the Inſides of the Lips. Now though the Kernels we have juſt named are ſwelled in the very firſt Appearance of the Glanders, yet the others within the Lips are not at all affected: the Diſeaſe not being concerned with the Mouth, but only with the Glands of the Skin of the Noſtrils.

It alſo appears to be a Diſorder ſolely and particularly of this Skin and its Kernels; for it very rarely ſpreads to any other Part. In the extreme Degrees of the Diſeaſe, the Partition of the Noſtrils which is covered by this Skin will be eaten, by the Sharpneſs of the Humour thus ſurrounding it on every Side; but no Diſſection ever ſhewed any other Bone to be affected by the Diſeaſe.

The Farmer who conſults his own Reaſon upon the Reſult of all that has been ſaid, will be convinced, in Spite of all that the whole Liſt of his favourite Authors have written, that the Seat of the Glanders is entirely and only in this Skin of the Noſtrils, and its Kernels: and he will thence be led to purſue the Cure upon the only rational Plan, the attempting it only in that Place.

If the Liver, the Lungs, or the Brain, or any other of theſe Parts, were the Seat of the Diſeaſe, the Creature muſt be pining, and diſordered in other Reſpects beſide this; and ſooner or later would be carried off; whereas we ſee on the contrary, that this Diſorder ſhews itſelf on Horſes otherwiſe in perfect good Condition; and that when it has rendered them unfit for better Services, and they are delivered over to Hackney Coachmen, they live a long Time with it, and ſhew no Sign of any other Diſtemper. This, and the healthful Appearance of thoſe Parts when the Horſe is opened, ſhew that nothing there has been either the Cauſe of the Diſorder, or has been ſo much as affected by it.

CHAP. IV.

Of the Cauſes of the Glanders.

WE have ſhewn the Farmer what this Diſeaſe is, and ſhall from that Explanation naturally lead him to the proper and only Method of Cure: but as every thing here is practical, we ſhall introduce between theſe Conſiderations ſomething as to what may be the accidental Cauſe of it.

The Glanders may ariſe from a common Cold, as a ſtuffing up of the Noſe in our own Species is the common Effect of the ſame Accident; and in this Caſe the firſt Approaches of the Diſorder are to be guarded againſt, for they may be ſtopped, and that Miſchief eaſily prevented, which it will be, after it ſhould get rooted, very difficult to cure.

Thus, when a Horſe has got a Cold, and it falls upon his Noſtrils, let the Farmer remember that the Glanders are ſituated in this Part, and that a Cold is their natural Beginning. Let him remember that every Cold which falls upon this Part may ſettle into that terrible Diſorder, and conſequently take the firſt Care to remove it.

He will perceive when a Cold ſeizes this Part, by the Horſes ſhorting and frequently toſſing about his Head, and afterwards by the Noſtrils being more than ordinarily wet.

In this Caſe nothing is ſo natural as its turning to the Glanders. If the Horſe be in a feveriſh Diſpoſition at the ſame Time, the Skin and its Kernels will enflame as well as ſwell, and all the Symptoms may very naturally follow.

This may give our Huſbandman a juſt Notion of the Danger of a Cold to his Horſes: a great Phyſician, when his Patient told him he had only a Cold, anſwered, "Would you have the Plague?" and there is the ſame Reaſon for conſidering that Diſorder in the moſt ſerious Light, when it affects Horſes.

If it ſeize upon the Noſe let the Horſe be immediately blooded largely: then give him twice in the Day a good warm Maſh, and ride him gently afterwards. Keep him warm and clean, and the next Day give him the common Purge.

If this do not anſwer let him be blooded the Day after, as largely as at firſt, and purſue the ſame Courſe one Day more, and it rarely fails.

I have practiſed this myſelf, and I have recommended it to others; and I am certain with the greateſt Succeſs: I have all the Reaſon in the World to believe I have prevented the Glanders in many a Horſe; and can ſay with the greateſt Truth that I never had one, ſince I have followed this Practice, that has fallen to that Diſorder, which I reaſonably attribute to taking this Care in Time.

A Cold ſeizing upon the Noſe is not the only Thing that may cauſe the Glanders. A Surfeit may very naturally take the ſame Effect. This fouls the Blood, and produces groſs Humours in Abundance; and theſe may very naturally be diſcharged by the Kernels in this Skin, ſuch being their natural Office. This may ſwell, inflame, and ulcerate the Skin of the Noſtrils, and be an immediate Cauſe of the Glanders; and in this Way that Diſeaſe would probably be more dangerous than any other Way, and more difficult of Remedy.

In this Caſe however the Method of Cure muſt be the ſame, only with this Caution, that Sweeteners of the Blood muſt be given at the ſame Time. If this Caution ſhould be omitted the Diſorder might break out in the ſame Place again.

A farther Caution muſt be given the Farmer, that before he attempts to cure a Horſe by the Method to be delivered in the next Chapter, he be aſſured that the Diſorder is what he takes it to be: if he will obſerve carefully the ſeveral Symptoms we have ſet down, he cannot be deceived; but he muſt take Care that he do not ſuppoſe every Running at a Horſe's Noſe to be the Glanders; for in that Miſtake he may ſometimes ſet about a troubleſome and harſh Method of Cure, for a Diſorder that would perhaps have gone off of itſelf, or with a ſingle Bleeding; or he may, in ſome Caſes, attempt to remedy that which is, in its own Nature, incurable; and in the End diſgrace the Method, becauſe it would not cure a different Diſeaſe.

To explain this more fully, he is to obſerve the Difference between a Cold ſettling upon the Noſtrils, and the Glanders. We have ſhewn this may bring on the Glanders, but it is not that Diſeaſe itſelf, and ſlighter Methods will cure it. On the other hand, an Abſceſs in the Lungs may diſcharge itſelf at the Noſtrils of a Horſe, and this, though it on a ſlight Obſervation reſemble the Glanders, yet is altogether diſtinct in its Nature, Origin, and Situation; and therefore cannot be reached by the proper Cure of that other Diſeaſe.

When a Horſe runs at the Noſe, let the Farmer obſerve the Nature and Colour of the Matter. If this be ſharp, corroding, and ill-coloured, it looks like the Glanders, therefore let him next look into the Inſide as far as he can; and if he perceive the Skin ſwelled, inflamed, and full of little Sores, there is little Room to doubt of its being this terrible Diſorder. Let him next obſerve whether it runs continually, which if it does it is another Proof; and laſtly, let him examine the Horſe in all other Reſpects, and if he find him in every other Circumſtance well and healthy, he may conclude with Certainty that this is the Diſeaſe, and proceed to the Cure.

On the other Hand, if the Matter be thick and white, and the inner Part of the Noſe not inflamed or ulcerated; and if it run very little while he is at reſt in the Stable, and encreaſes on his being put to work; and finally, when he has a Difficulty of Breathing, and a rattling in his Breaſt as he takes his Breath, all theſe Symptoms conſidered together, will ſhew that the Diſeaſe is not the Glanders; but an Abſceſs in the Lungs.

This is a Diſorder which the proper Method of Cure for the Glanders cannot reach, therefore it will be vain to try it; and indeed, as nothing can cure ſuch a Malady, it is in vain to attempt any thing for it.

CHAP. V.

Of the Method of Cure for the Glanders.

WE ſee that the Glanders is a Collection of Ulcers in the Skin of the Inſide of the Noſe, and its Glands: this is the whole Fact; and knowing this we may advance rationally to the Cure.

The only Method of effecting this muſt be by cleanſing and freeing the Parts from the Lodgment of this ſharp Matter, and the healing of theſe ſeveral Ulcers.

That might be done in the ſame Manner as external Sores are cleanſed and healed, but the Difficulty is how to come at theſe for the dreſſing, cleanſing and healing them. It is plain this cannot be done by the Noſtrils, for there is no Way of getting freely and properly at the Complaint by this Method, therefore the firſt Thing is to be to make the Opening to the Place where Nature has not given any. We know now that the principal Seat of the Diſeaſe is the Glands or Kernels of this Skin, within the Cavity of the Forehead Bone, and we are to proceed accordingly.

When the Skull is cracked, and beat in by a Fall or Blow in our own Species, the Surgeon cuts a Hole through it in another Place, that he may have Way to come at the depreſſed Part within. This Operation is very terrible but very ſafe: it is practiſed continually, and with Succeſs. What we are ourſelves able to endure, certainly this coarſer Creature may. On this has been founded the only rational Method ever laid down for the Cure of the Glanders.

A Hole is to be pierced through the Skull of a Horſe, in ſuch a Place as is leaſt liable to Inconvenience, and moſt properly ſituated for the throwing in proper Liquors to the Seat of the Diſorder.

The firſt Conſideration in this Reſpect is, whether the Glanders be ſeated only in one Noſtril, or whether it have ſeized on both: if only one be affected, then one ſuch Opening through the

Skull will be enough: if both Noſtrils be infected with the Diſorder, then two ſuch Openings are to be made, one for each.

The Place for this Opening to be made therefore is, on one Side or both Sides the Head. It may be done without the leaſt Inconvenience or Hurt to the Creature, and it will give a free Paſſage to the neceſſary Applications. The beſt Place for the Hole to be opened is at ſome Diſtance below the Eye; and there is not the leaſt Danger from the Operation.

In the performing it on the Human Species, if any bad Conſequences ever attend it, they are not owing to the cutting a Hole through the Bone, but to the injudicious Hand of the Operator hurting the Brain in doing it. Now in Horſes the Brain does not come ſo low as to the Eyes; and therefore in making two Holes, or more if neceſſary lower down, there is not the leaſt Danger of any bad Accident.

The Safety of this leading Operation being thus ſhewn, the Uſe of it is evident. The proper Liquors for waſhing and cleaning of the Parts, are to be thrown in at theſe Openings by a Syringe; and the Holes are to be ſo made that the Syringe being pointed upwards, the Hollow in the Forehead Bone, which we have ſhewn to be the great Seat of the Diſeaſe, may be thoroughly waſhed by it. It would be very much to be wiſhed, that the opening could be made juſt where this Hollow of the Forehead Bone is; but that lies ſo high that a Farrier might do Miſchief. The Brain is ſituated there for the Part is conſiderably above the Eyes, and more toward the Middle of the Head, but it will anſwer every good Purpoſe of this Method if it be made lower, and the Liquor be thrown up into it. In this Method one Aperture or Hole may be made to anſwer the Purpoſe in moſt Caſes, though there will not be the leaſt Diſadvantage in making two or more for better Convenience.

Though the Cavity or Hollow in the Forehead Bone lies higheſt; yet the Hollows we have deſcribed before at the Sides of the Partition of the Noſtrils are the moſt difficult to be well cleaned. Upon two Principles alone turns the whole Method of Cure in this Caſe; the firſt is, that there be a Way by which the Liquor intended for waſhing and cleanſing the Parts can be conveyed to them through a Syringe; and the other is, that when the Matter is thus waſh'd off from the Skin and its Kernels, there be a Paſſage for the Liquor and that foul Matter to go off freely together.

Now in Reſpect of the Matter lodged in the Hollow of the Forehead Bone, that being waſh'd away by the Liquor from the Syringe will very freely and naturally diſcharge itſelf, together with that Liquor, out at the Noſtrils; but it is not ſo in the natural State of Things, with Reſpect to the Matter which fouls the Inſide of the Hollows ſituated at the Sides of the Partitions of the Noſe; for we have ſhewn already that they are ſo deep and crooked, that there is no Way of getting any thing once lodged there, out of their Bottoms, by the natural Paſſages.

This incurs the Neceſſity of another Opening in the Bone, to be made by Art, but as this muſt be much lower than the other, there can be no Danger in the making it. All below the Eyes in a Horſe's Head ſhould be conſidered as the Bone of the Noſe, not the Skull; we underſtand by Skull the bony Covering of the Brain, and there is no Brain within or near that Part.

Thus the Farmer ſees that an Opening in this Place is altogether neceſſary, and not at all dangerous. It would be in vain to waſh off the Matter in theſe Cavities ever ſo clean, if, when that were done, a Part of it muſt of Neceſſity be left in the Cavity, together with ſome of the Liquor of the Syringe; but this is eaſily to be diſcharged in this Manner.

Upon this Conſideration, the very beſt Place for making this Opening to waſh and clean theſe Cavities, is to pierce through the bony Diviſions; and then to open another Hole ſomewhat lower, to give Paſſage for all that is waſh'd out.

The beſt Direction for the exact Place of theſe Holes is, that the Farmer and the Farrier together examine the Skull of a dead Horſe. They will there ſee how theſe ſeveral Cavities are placed, and by that know better than by any formal Directions of Words or Figures, where to make them.

When theſe Holes are opened, and the Syringe is uſed, the proper Method is to throw in the Liquor forcibly; and then to ſtop the Noſtril, that it may be forced out at this Hole, by which Means all will be perfectly cleared; and by a Repetition of this cleanſing, and an Injection of proper Liquors, the Diſeaſe will be perfectly and thoroughly cured. This reduces the Glanders to the Condition of an outward Malady, and it is thus to be remedied in the ſame Manner.

In Caſe of the Matter, together with the Injection, not coming freely and perfectly out at the lower Opening, nothing more is needful than to make Way for it by thruſting in the Point of any ſharp Iron Inſtrument. It frequently happens that the Bones have a particular Conſtruction in this Part; but when they have it is attended with no farther Difficulty. This Conformation may ſtop in the Matter, or a Part of it, and the Opening thus made never fails to diſcharge it. If the Opening made by the Point of the Inſtrument, ſhould cloſe up before the Time, it may be kept open by burning it with a red hot Iron.

This Method of Cure was propoſed in FRANCE, and there very well received; and there is no Queſtion of its Succeſs wherever it ſhall be introduced. We have ſhewn the whole Deſign and Nature of the Operation, and ſhall in the next Chapter treat of the beſt Methods of preparing the needful Liquors for injecting.

CHAP.

CHAP. VI.

Of the Liquors to be injected for a Cure of the Glanders.

WE have now to lay before the Farmer the moſt proper Liquors for performing the Cure, and theſe we ſhall adviſe to be of three Kinds; the firſt cleanſing alone, the ſecond cleanſing and healing, and the third Spirituous and Styptick.

For the firſt Liquor let him proceed thus, ſet on three Gallons of Water to boil, and have ready three Pounds of fine Stone Lime new made. When the Water boils pour it into a Pan, large enough to hold three Times the Quantity, and by Degrees put in the Lime. There will be a great ſwelling and boiling up, and when all is over, and the whole thoroughly cold, the Water will ſwim clear and tranſparent at the Top, and the Lime will be ſettled in a white Powder at the Bottom.

Pour off this clean Liquor, and ſet it by all Night; then in the Morning there will be a Skin upon it; ſcum this off and bottle up the clear Water. This is Lime Water of an exact Degree of Strength for the intended Purpoſe. Let the Farmer be ſure not to buy it, but to make it himſelf in this Manner.

To a Quart of this Lime Water put a Quarter of a Pint of Vinegar, and half an Ounce of Baſket Salt, let it all melt together, and then it will be fit for Uſe.

Two Openings being made in the Head of the Horſe, let a Pewter Syringe be got, that has a good Strength to throw the Liquor out, and that will hold about half a Pint.

Set on this Quantity of the Liquor juſt named, to warm; and when it is of ſuch Heat that the Hand can be bore in it ever ſo long without Pain, it is fit for Uſe. Hold the Noſtrils of the Horſe together, and drive in this Liquor carefully and forcibly. It will run out partly at the lower Hole, and partly at the Noſtrils, when they are let open; as they ſhould be at a proper Time, when the greateſt Part of the Liquor has gone the other Way.

When this Syringefull has been uſed in this Manner, heat as much more, and throw it up in the like Way. Then let the Horſe reſt twelve Hours, after which repeat the ſame Method exactly.

Morning and Night are the beſt Times of doing it; and this is to be continued four Days, but with the Uſe of the ſecond Liquor in the Middle, and at the End of that Time.

The ſecond Liquor is thus prepared. Set a Fire Shovel over a very gentle Fire, and put into it a quarter of an Ounce of green Copperas beat to Powder: ſtir it about till it becomes a dry grey Duſt. Put this into two Quarts of Molaſſes Spirit; and add a little Scrapings of Oak Galls. Shake this up and ſet it by all Night. In the Morning it will be black like Ink, and this is a cheap and eaſy Way of preparing the famous Styptick of HELVETIUS.

Upon the ſecond Day uſe the Water with the Syringe, at Four o'Clock in the Afternoon, inſtead of late in the Evening; and, towards Night, warm half a Pint of this black Tincture.

Throw this up with the Syringe in the ſame Manner as the other; and leave the Horſe to his Reſt.

The ſame do on the Evening of the fourth Day, and then prepare the third Liquor.

Powder a Quarter of a Pound of Alum, and add to it the ſame Quantity of white Vitriol. Put them into a ſtrong Earthen Pipkin, without any Water, and ſet them over the Fire; they will melt and afterwards dry again.

Then take them off, grind the Whole to Powder, and put it into a large Jar: pour upon it a Gallon of the Lime-Water juſt directed to be made, ſtir them well together with a Stick, and leave them all Night.

In the Morning pour off the clear Liquor, leaving the Settlement behind; add to it a Quart of ſtrong Vinegar, and bottle it for Uſe.

This is to be the Liquor for injecting, after the four firſt Days.

Every Morning and Evening warm a Pint of this, and carefully throw it up by the Syringe, obſerving to ſtop the Noſtrils at firſt, that the greateſt Part of the Liquor may each Time run out through the lower Hole in the Face: then let ſome of it come laſt of all through the Noſtrils; by this Means, every Part of the affected Skin will be waſhed and cleanſed twice a Day by this excellent Liquor; and, by Degrees, the Whole will heal.

Every other Day, inſtead of Evening, the laſt Injection of the Water muſt be performed in the Afternoon, as directed in the preceding Article; and at Night of each of thoſe Days, the Black Tincture is to be injected, as directed before.

This is a plain, rational, and ſafe Method of Proceeding; and by this Means the Glanders will be perfectly cured, at a very ſmall Expence, and with no great Trouble. Many ſerviceable Horſes will be preſerved from the Dogs, or from the meaneſt Employments, and rendered as valuable as if the Diſeaſe had never attacked them.

As to the Time required to perfect a Cure, it will be different, according to the Degree of the Diſorder; but, in general, it may be called three Weeks or a Month; the Progreſs of the Cure will be ſeen by the Stoppage of the Running; and it will always be adviſeable to continue the Injections a Fortnight after the Cure ſeems perfect, every other or every third Day.

If the Fleſh grow faſt about the Openings, it muſt be kept down by a hot Iron; for there muſt be preſerved all the Time a free Paſſage for the Liquor both in and out; and if the Horſe be otherwiſe diſordered, Brimſtone and Antimony are to be mixed and ſprinkled over his Provender.

CHAP. VII.

Of Purging a Horſe.

THERE are a great Variety of Occaſions on which this Creature may want purging, and many Sorts of Phyſic may anſwer the Purpoſe; but before we come to the Method of preparing any of theſe, it will be neceſſary to give the Farmer proper Directions concerning the Uſe of ſuch Medicines. A Horſe muſt be prepared for a Purge the Day before it is given him, or it will take very little Effect; and then it will operate more or leſs, according to the Management of him during the Time.

The Day before a Horſe is to be purged, give him a good Quantity of Water with ſcalded Bran in it, and let him have it warm. Keep him quiet, and the next Morning, before he has any thing to eat, give him the Purge. Any one of the following will anſwer the common Purpoſes, with little Charge.

1. *A Purge with Aloes.*

Take an Ounce and a Quarter of Horſe-Aloes beaten to Powder, and a Quarter of an Ounce of Cream of Tartar, mix theſe up with an Ounce and a half of freſh Butter, and half an Ounce of Powder of Anniſeeds, work this up into a Conſiſtence, and roll it round into two Balls. Rub theſe over with Butter, and give them to the Horſe; they will, by Means of being greaſed, ſlip down very freely; and after them give him a Horn of ſmall Beer made warm.

The Doſe is to be made larger or ſmaller, as the Horſe is larger and coarſer fed, or finer limb'd, and managed more delicately. There is as much Difference between the Conſtitution of a Cart-Horſe and a Racer, as between a Drayman and a Perſon of Quality; and they muſt in all Reſpects be treated accordingly, not only in the Strength of the Doſe, but in the Management afterwards: for what ſuits one will be quite improper for the other.

2. *A Purge with Jalap.*

Take Powder of Aloes an Ounce, Powder of Jalap a Quarter of an Ounce, and powdered Ginger a Dram: mix all theſe up with two Ounces of freſh Butter, and make the Whole into a Couple of Balls, or more; greaſe them on the Outſide, and give them to the Horſe with ſome warm Ale afterwards. Theſe are two common Receipts, but they are often ill proportioned in the Quantities; ſomething of this Kind ſtands under the Name of a Purge for Horſes in moſt Books that treat of theſe Things; but the Quantity of the Anniſeeds is too great, in the common Directions for the firſt; and this will make a Horſe ſick afterwards; and to the other there are commonly added uſeleſs Ingredients. Theſe are approved Proportions, and they will anſwer almoſt every Occaſion there can be for a Horſe's being phyſicked in this Way.

CHAP. VIII.

Of managing a Horſe with his Phyſic.

WE have directed how a Horſe is to be prepared for his Purge, by giving him a proper Drink the Day before: but it is needful we tell the Farmer how he is to conduct him when he has ſwallowed it.

Let the Balls and the Beer be given him early in the Morning, and let him then be rid out gently for a Quarter of an Hour. Then bring him cool in, and let him be ſet up two Hours without Food.

After this Time give him a ſmall Quantity of good Hay, and a Quarter of an Hour after that ſome warm Water.

An Hour after this give him ſome ſcalded Bran. He will purge kindly after this Manner of Management; and after this he ſhould be rid out a little again; then when he is brought in, he ſhould have ſome Bran and Water warm, with but a ſmall Quantity of the Water. Then led him be rid out again; in this Manner a Horſe is to be treated with his Purge, and, in general, it will be eaſy to make it work more or leſs at Pleaſure, by giving him more or leſs Exerciſe, and more or leſs of the Bran and Water.

If the Purge have been too violent, and will not ſtop, the following Aſtringent Drink will always ſtop it.

An Aſtringent Drink.

Boil three Pints of ſtale Beer, and ſome Pieces of Cruſt of brown Bread: to this put an Ounce of Whiting, and a Quarter of an Ounce of Diaſcordium, made without Honey: if this does not ſtop it, in four or five Hours, give the ſame Quantity of Whiting, and double the Quantity of Diaſcordium, in only one Pint of the Beer and Bread. This will make him altogether quiet and eaſy, and he will be in his Body as uſual.

CHAP. IX.

The Care of a Horſe in taking him up from Graſs.

IT is a common Thing, and generally very proper, to purge a Horſe when taken up from Graſs; but this muſt not be done immediately on taking up; he ought to be kept in the Stable a Week; and he ſhould have ſcalded Bran twice before the Purge.

There muſt be a great deal of Care taken of a Horſe, in general, in the taking him up from Graſs, otherwiſe he will fall into Diſorders very difficult to cure. It is much better to prevent them by a timely Care.

He muſt be dry when taken up from the Paſture, otherwiſe he will very likely grow ſcabby.

Bartholomew-Tide is the lateſt he ſhould be left out, if of any thing a tender Make; for

after this Time he will have more Cold and leſs Nouriſhment.

The Dews are very nipping after this Seaſon, and the Graſs has loſt its Strength; ſo that partly for Want of Nouriſhment, and partly for the chilling of his Blood, it is much if he eſcape ſome Diſorder. Many a Horſe has been rendered unſerviceable the greateſt Part of the Winter, and been an Expence into the Bargain, from the leaving him out a little too long.

It is a very good Method with a delicate Horſe, to trim him as ſoon as he is taken from Graſs. To this Purpoſe, he is to be led out in a fine warm Day, and when he is trim'd, ſome Soap and a good Quantity of warm Water is to be got ready. He is to be rubbed over with the Soap, taking Care it does not get into his Eyes or Ears, and then waſhed with the warm Water and ſome Flannel-Cloths: this is to be done twice over, and he is then to be led into the Stable, and gently rubbed with a Cloth till perfectly dry.

This Cleaning is very comfortable to the Creature, and at the ſame Time takes off all Sorts of Foulneſs got at Graſs, of which there are many Kinds not to be met with in the Stable. He is then to be kept a Week or more in the Stable, and purged and blooded. This Courſe naturally and perfectly reconciles him to the new Method of living, and he falls into no Diſorder.

CHAP. X.

For a Cold.

THIS is a Diſorder ſo well underſtood, that it cannot be miſtaken, nor does it need any Explanation.

Boil in a Quart of Ale three Ounces of freſh Liquorice-Root, beat very fine into Threads. Strain the Liquor off, preſſing it hard, and add to it three Drams of Elecampane Powder, one Dram of Powder of Anniſeeds, a Quarter of a Pint of Oil, and a Quarter of a Pound of Honey; mix all well, and give it warm. If it does not take Effect the firſt Time, let it be repeated three or four Times, and it ſeldom fails.

Balls for a Cold of long ſtanding.

Put into a large Bowl ſix Pounds of Wheat Meal, mix with it two Ounces of Powder of Aniſeeds, Cummin-ſeed one Ounce, Linſeed three Ounces, Fenugreek-ſeed one Ounce and a half; ſtir theſe well about, then mix half a Pound of Liquorice Powder, and a Quarter of a Pound of Flour of Brimſtone, add theſe to the reſt. Laſtly, add Bay-berries and Juniper-berries, powdered, three Ounces of each, and the ſame Quantity of Powder of Elecampane.

When all are well ſtirred and mixed together, break ſix Eggs, throw away the Whites, beat up the Yolks with two Quarts of Mountain Wine. Add to this a Pound and a half of Honey and a Pint of Sallad Oil. Mix all theſe perfectly well together; then bring in the Powder, and work the Whole to a Paſte. If this ſhould be too ſtiff, a little more Wine muſt be added; and, if too ſoft, ſome Flour muſt be put in, till the Whole be of ſuch a Conſiſtence that it will conveniently roll into Balls.

Theſe are to be made of the Bigneſs of a Hen's Egg, but round. This rolling them up is only for the Convenience of keeping; when they are to be uſed they are to be diſſolved. Two is the proper Quantity for a Doſe, and they are to be melted in the Creature's Water, Morning and Evening, for fifteen Days.

CHAP. XI.

For the Sleeping Evil.

THE Sleeping Evil in Horſes, is the ſame that we call the Lethargy in our own Species, and it will be as fatal to them as it is to ourſelves, if not remedied in Time. The Cauſe is their eating a great Quantity of coarſe Food, and having leſs Work than uſual.

It ſhews itſelf by their being ſluggiſh, and continually ſleeping or dozing: the Remedy is the following Ball.

Pound in a Marble Mortar a Handful of the Plant called Wall-Pepper, or ſharp Stone-Crop; it is a common creeping Plant upon Walls, and bears yellow Flowers. Put to this a very little White Wine, and ſqueeze out the Juice. Grind in a Mortar four Ounces of Elecampane Powder, and one Dram of Powder of Pellitory of SPAIN; add the Juice to theſe, and then put in a Quarter of a Pound of CASTILE Soap, work and beat all well together; and then put in Liquorice Powder by a little at a time, to bring it to a ſoft Paſte. Keep this in a Pot, and every Morning, before he has taken any Food, give him a Piece of it as big as a large Walnut, greaſed. Let him drink Milk and Water, warmed, after it, and keep him ſtirring.

This is a Receipt I have ſeen try'd many Times, and never once found it fail to make a perfect Cure.

CHAP. XII.

For the Gargle.

THIS is a Diſorder that principally affects the Head and Throat of the Horſe, and, if not taken in Time, is very dangerous. It is alſo unfortunate for the Farmer in another Reſpect, for it is contagious; and, from one Horſe will ſpread itſelf through a whole Stable.

It is moſt dangerous in the Autumn of the Year, and generally attends very dry Seaſons, when there being a Scarcity of Water, the Horſes are forced to drink what is foul and bad.

I have alſo known it plainly cauſed by Horſes feeding upon a poor bad Graſs in wet Places; where there generally lies Water over the Ground; but it happens to be dry at theſe Seaſons. Some Horſes are fond of this filthy Food: I have obſerved their Chops all dirted with eating it down to the Stumps; and generally the Gargle has followed.

A Horſe that has the Gargle hangs down his Head and is reſtleſs: he breathes with Diffi-

culty; his Eyes are gummy, and his Head ſwells; he rattles in the Throat, and he goes weakly and ſtaggering.

As ſoon as the Farmer ſees this Diſorder in a Horſe, let him ſeparate the Creature from the Reſt; and it will be very proper to bleed them all by Way of Prevention.

Then bleeding the ſick Horſe more largely than the others, give him the following Drench.

Set on two Quarts of Ale to boil, and as it heats ſtir in a Dram of Saffron cut ſmall with a Pair of Sciſſars, and Half an Ounce of Philonium Romanum. Bruiſe two Heads of Garlick and two good Handfuls of Wormwood, preſs out the Juice ſqueezing it very hard, and pour this to the Reſt; let it boil a little, and then ſet it off.

This is for two Doſes; if the Horſe be very bad, he may have one in the Morning and another at Night; and if not ſo violently taken, one at Night only will do, keeping him three Hours without Food before, and giving him nothing after it.

Let this be repeated every Day, or every other Day, according to the Degree of the Diſorder, for four Times, and let him all the while be kept warm, and give him boiled Oats and ground Malt in a Maſh.

CHAP. XIII.

For Roughneſs of the Coat and Swelling of the Heels.

WHEN a Horſe grows rough in a Stable in Spite of the uſual Care, and his Heels ſwell, the following Mixture is to be given him with all his Food.

Take a Pound of Flower of Brimſtone, half a Pound of Turmerick, and a Quarter of a Pound of Crude Antimony in Powder. Sift theſe together; by which Means they will be thoroughly mixed, and ſtrew a little of it over and among all his Victuals.

CHAP. XIV.

For a ravenous Appetite.

THERE is a Diſorder in our own Species which Doctors call a Canine Appetite, that is an Appetite like a Dog, greedy and devouring every thing, with no Advantage to the Body. Horſes are ſubject to the ſame, and they will conſume more than their due Quantity of Food if it be given them, and ſtill be poor and lean. In this Diſorder they ſwallow their Meat without chewing it. It is much more common than is thought; and we adviſe all who are concerned with Horſes to regard it. They may know it by watching the Horſe's Manner of eating, and by obſerving his Stools.

If he ſnatches at every thing, and eats greedily and vaſtly quick, it is a ſuſpicious Circumſtance: and if his Food be ſeen in a Manner entire and unaltered in his Dung, it is a Proof. When Horſes have this ravenous Appetite to a great Degree, their Provender will go through them quite unaltered, and they will grow poor and weak till they are uſeleſs. In this Caſe give him the following Drench.

Mix together a Gallon of Milk and a Quart of Oil: ſtir in as much raw Wheat Flour as will mix in without making it too thick for ſwallowing eaſily. Give him a good Drench of this every Morning before he taſtes any Food, and about half an Hour after offer him ſome Hay. He will not be ſo ravenous, though he has eat nothing: give him a moderate Quantity, and then let him be quiet.

When he has been rode out a little, or worked for ſome Hours, give him ſome more Hay. He will ſnatch at it and be ravenous as uſual; but let him have only a little at a Time, and let him ſee no more. This Way feed him to the Fill by a little at a Time, till he will not eat any more; then ſet a good Quantity before him, but don't let it remain a great while in his Sight.

Repeat this Conduct every Day for a Week, and he will eat like other Horſes. I have ſeen this tried very frequently and ſucceſsfully.

CHAP. XV.

For the Staggers.

THIS is a very terrible Diſeaſe, and has been fatal to many a ſtout Creature.

The principal Cauſe of it is the Careleſſneſs of Servants, in turning a Horſe out to Graſs while he is hot from Travel or Labour. This gives him a violent Cold, which loads his Head with a tough Phlegm.

A Horſe is known to have the Staggers by his tottering, ſtaggering, and going weakly and faintly. His Eyes will be wateriſh, and at firſt he will thruſt his Head into the Litter, and by toſſing it up and down ſhew his great Uneaſineſs: in the more violent State of the Diſeaſe he will beat his Head againſt the Wall in his Agony.

This is a Diſeaſe ſo dangerous, that it ſhould be watched in the beginning; for it is then much eaſier cured than afterwards.

The firſt Thing is to bleed him; and this muſt be largely. If the Diſorder be perceived in Time, a good Bleeding alone is often a Cure. Some adviſe bleeding in the Flank, but it is of no Conſequence from what Part, except in the Head itſelf; which, if the firſt Bleeding do not ſucceed, may be very well done during the Uſe of the other Remedies.

We ſee frequently, that a natural Bleeding at the Noſe carries off Diſorders of the Head in ourſelves almoſt immediately. The Sailors have a Way of bleeding themſelves in violent Headachs between the Griſtles at the End of the Noſe, and they find great Relief from it: and Dr. Dover tried very hard to bring up the Cuſtom of bleeding in the ſame Part more artfully. I have known it tried ſometimes, and always with Succeſs; but neither the Surgeons nor the Patients liked it, ſo it preſently dropped. The Good accruing from this bleeding, though in never ſo ſmall a Quantity, ſhews what may done

done for a Horſe in this terrible Diſorder of the Head the ſame Way. The Country Farriers Method of doing it is a very coarſe one, but I have ſeen it ſucceed well, and great Good ariſe from it.

They ſharpen a tough ſmall Oak Stick, and ſplit it at the End like a Fork. They thruſt this up the Horſes Noſtrils, and ſet them bleeding; and this is very ſucceſsful. It may be done after two Days, if the following Medicines do not take Effect.

Two Hours after the common bleeding give him the following Glyſter. Heat two Quarts of Emetick Wine, and diſſolve in it a quarter of a Pound of Unguentum Populneum: throw up this as a Glyſter and let him reſt.

Mean time prepare the following Medicine: boil together two Ounces of Powder of the Scoria of Liver of Antimony and five Pints of ſtrong Beer. When it has boiled five Minutes take it off the Fire: diſſolve in it a Quarter of a Pound of Butter.

An Hour after the firſt Glyſter has come away give this in the ſame Manner, and then walk him gently out in a warm dry Place. Rub his Legs well with Whiſps of Straw wetted in ſome Water, and feed him with Bran and Bread, and warm Water.

Two Hours after the ſecond Glyſter has come away, diſſolve an Ounce of Venice Treacle in a Pint of White Wine, and give it to him as a Drench: and preſently after give him another Glyſter thus made.

Boil a double Handful of Mallows Roots and all in two Quarts of Spring Water to a Quart; then add to this when ſtrain'd off two Ounces of Sal Polycreſtum, the ſame Quantity of Venice Treacle, and three Quarters of a Pint of Oil: give this warm, and ſet him up for Reſt.

The next Day let one or other of theſe Glyſters be repeated as Occaſion may require; and put into his Ears ſome pounded Rue, black Hellebore Root and Pepper mixed up with Brandy. Sow up his Ears to keep this in, and let it remain there all Day. Give him the following Drink. Boil in two Quarts of Ale two Ounces of Turmerick, and the ſame Quantity of Aniſe Seeds in Powder; add to the ſtrained Liquor a Quarter of a Pint of Brandy, and give it for a Drench.

The Diſorder is a very ſevere one; ſo that it commonly ſoon terminates either in the Death of the Creature, or in his Recovery from the immediate Danger: but ſometimes, though he get ſoon out of Danger, he recovers ſlowly. In this Caſe the Glyſter need not be repeated, but he ſhould continue in a Courſe of the Drench for ſome Time, and be kept carefully warm and well rubbed.

There is alſo a famous Remedy which often aſſiſts the others greatly; or ſometimes ſucceeds by itſelf: it is this.

Dig up a Dock Root and quarter it; cut a Slip of the Thickneſs of Half a Finger, and an Inch long: ſpread a Plaiſter of common Pitch of Half the Breadth of the Palm of the Hand: theſe two Things being in Readineſs, cut a Slit through the Skin to the Bone in the Middle of the Horſe's Forehead: lay in the Piece of Dock-Root, and cover it with the Plaiſter.

If it runs in twelve Hours, the Horſe will be likely to recover; if not at all, the Caſe is deſperate. Theſe Methods have recovered many a Horſe in my own Stable; and I can therefore recommend them from Experience. Indeed I ſhall ſet down here none but ſuch as I have either tried myſelf, or have been told of from the Experience of People of Credit.

CHAP. XVI.

For the Farcy.

THE Farcy is not ſo deſperate or violent a Diſeaſe as the laſt deſcribed; but it is the moſt loathſome that can be conceived: it is a creeping Ulcer, that ſpreads and runs in a moſt offenſive Manner; and is not eaſily remedied when got to any Height.

The firſt Appearance of it is in hard Knobs and Lumps; and theſe ſpread till they over-run the greateſt Part of the Body in this filthy Manner.

It is owing to a diſordered State of the Blood from bad Food and unreaſonable Fatigues; and when a Horſe is in a Condition to receive the Diſeaſe, ſometimes it will be catched by ſtanding near another that has it. Indeed when the Blood is diſpoſed for it, a very little external Injury will bring it on; the ſpurring with a ruſty Spur, the wounding the Mouth with the Bridle, the galling with the Belt, or any other Hurt.

Often a Horſe will itch ſo in ſome Part with the Foulneſs of his Blood, that he will rub till he breaks the Skin, and the Diſorder ſhall begin that Way, and ſpread quickly. The principal Cauſe is what we have named, unreaſonable Fatigues, and Heats and Colds ſuddenly upon them: but we muſt warn the Farmer of one Way of its coming which few are aware of; which is the fattening up a Horſe haſtily, and taking him from a laborious Life to a quiet Stable.

I have ſeen this Error frequently made. A Farmer having a Deſign to part with a Horſe, has taken him up to fatten in a Hurry; and inſtead of anſwering his Purpoſe, has given him this Diſorder.

It is to be cured moſt eaſily when taken in Time; but the Generality of the Country People are ſo unuſed to theſe Conſiderations, that they don't perceive the Diſeaſe till it is at the Height.

I ſaw a Neighbour James Barnes's Horſe in 1738 cured perfectly, when it was taken in Time, in about a Fortnight; and it was done thus. Firſt the Horſe was blooded largely in the Neck; then the whole Body of him was carefully looked over, and ſeveral of the Knobs were found in different Parts, beſide the two or three that were burſt.

A Liquor was thus made to rub them. Take Half a Pound of Wood-Soot, and the ſame Quantity of Soap Lees, boil them up together; put in two Ounces of Allum, and an Ounce of Verdigreaſe, and a little Water, and ſtir all well together; then put in a Dram of Powder of Euphor-

Euphorbium, and four Ounces of Powder of white Hellebore Root: let the whole boil up together, and then pour it into a Jar.

With this the Horſe was rubbed in all the Places where the Diſeaſe appeared; and at the ſame Time a good deal of Flour of Brimſtone was given him in his Food. The Cure was perfected by this Means, and the Diſeaſe never returned.

Another Method is to anoint the Places with Ratſbane mixed up with Butter; and at the ſame Time give him the following Drench. Take a Handful of the inner Bark of the Elder, the ſame Quantity of the inner Bark of the Walnut Tree, and the ſame of Berberry Bark; cut all theſe ſmall, and put them into two Quarts of ſtrong Beer: let them boil a conſiderable Time. Near the End of the boiling throw in a Handful of Wall Pepper ſhred fine. When it has boiled up once or twice with this, ſtrain off the Liquor, preſſing it hard.

Put to the ſtrained Liquor a Quarter of an Ounce of Grains of Paradiſe, and an Ounce of Powder of Turmerick, and give it for one Doſe.

This muſt be repeated every Day as long as the outward Remedy is uſed; and the beſt Management of the Horſe during ſuch a Cure, is to give him moderate Exerciſe and moderate Food: any Extream is equally wrong.

When the Diſeaſe is in its worſt State, the Sores will not give Way to any of theſe Applications. They muſt be burnt with a hot Iron, and then the ſame Courſe followed that has been directed already: for the ſame Remedies that would take no Effect before, will anſwer the Purpoſe after the Effect of the hot Iron.

CHAP. XVII.

Of the Malanders.

THIS is another external Diſorder of a Horſe very painful and troubleſome, and very difficult of Cure; inſomuch that ſome ſay nothing more is to be attempted than to alleviate the Pain; and that it is dangerous to ſtop the Diſtemper.

This is a very unhappy Error; for there is no Degree of the Malanders but may be cured by proper Management; and that with perfect Safety.

This Diſeaſe ſhews itſelf on the fore Legs, upon the inner Part juſt againſt the bending of the Knee.

It is not a Knob or Ulcer like the Farcy, but a hard, dry, flat Scab, of which ſometimes there is only one great one, ſometimes ſeveral ſmaller; and theſe are cracked and chopped upon the Surface, and have ſtiff Hairs like Briſtles growing upon them.

This is the whole of the Diſorder: it ſometimes is very violent and inveterate, ſometimes more ſlight. When it is very bad it makes the Horſe halt; and when leaſt it occaſions him to go ſtiff till warmed with Exerciſe.

The general Cauſe of the Malanders is bad Management. It is the common Diſorder of Horſes kept in a ſlovenly Manner, and much more rarely affects thoſe which are managed more carefully.

Thoſe Horſes are moſt ſubject to it which have moſt Hair upon their Legs; and they are the difficulteſt of Cure.

One eſſential Difference the Farmer is to make in his Conduct, for a Horſe under this Diſorder, which ariſes from this Conſideration, that ſometimes the Malander is only a Soreneſs in the Part, while the Horſe is otherwiſe in Health; ſometimes the Blood is corrupt and bad, and in this Caſe the Diſorder is more violent in its Degree, and more difficult to be cured.

When the Malander is only the Effect of Careleſſneſs, and 'tis upon a Horſe otherwiſe healthful, the Method to be obſerved is this.

Let him be kept to his uſual Work and uſual Food; and let the following Waſh be made for the Part. Set on a Saucepan with three Quarts of Water, put to it half a Pound of Fenugreek Seed bruiſed, and a Pound of freſh Marſhmallow Root cut in Slices. Boil all this till it is like a Jelly, ſtrain it off hot and preſs it hard out, then add to the thick Liquor half a Pound of Opodeldock Ointment. Make ſome of this hot Morning and Night, and dipping Flanels in it, wrap them round the Leg where the Complaint is, as hot as the Hand can bear to touch them. Let this be ſeveral Times repeated; and at the laſt of all, wet ſome of the Ingredients, which muſt be ſaved when the Liquor has been preſſed out, with ſome of the Liquor hot, and lay them upon one Flannel, cōver them with another, and wrap the whole round each Leg, tying it round ſo as to keep it on, but not tight.

Let this be done every Day twice, as directed, till the hard Subſtances begin to ſoften; after this once in four and twenty Hours will do; and there will thus be a perfect Cure.

Before the firſt Dreſſing let the Hair be clip'd round about the Place, and the whole Part about the Malanders waſh'd clean with warm Soap Suds. Let this be repeated at Times dureing the Cure; and after it is perfected, let the Legs be kept very clean in this Part, for fear of its returning.

In this Manner a Horſe will be cured very eaſily, and very certainly, that has no Taint in his Blood: but if there be that added to the outward Malady, Care muſt be taken accordingly, by giving inward Medicines at the ſame Time.

When this is the Caſe the Owner will perceive it by his Habit of Body; and by the outward Remedy not taking its deſired and natural Effect, he is then to proceed thus.

Let a Pound of crude Antimony in Powder be mixed with four Pounds of Flowers of Brimſtone; and let ſome of this be ſprinkled among all his Food. This is better in ſuch a Caſe than giving it in Balls or Drenches, for he takes it with his Nouriſhment a little at a Time, and often; and accompanying the Food in its Paſſage through the Inteſtines, its Virtue goes into the Blood, together with the nutritive Part of the Food.

I have heard many who ſhould know ſomething better than the Vulgar, ſay that they would not cure a Horſe of the Malanders if they could,

for that all that is prudent is to keep him from growing lame with them. They have an old Proverb that has miſled them from Father to Son for many Generations, which is, That cureing the Malanders is ſhutting up the Wolf in the Sheep Cot. But they may be ſure of this, not only in the preſent Caſe, but in all others whatever, that there will be no Danger or Damage in curing any outward Diſorder, when the Blood is at the ſame Time rectified within.

We have ſhewn the Difference already, that when the Complaint is only external, outward Remedies alone may be truſted, but when the Blood is affected inward Things muſt be given to aſſiſt. The Danger even of a Miſtake in theſe Caſes, is not ſo great as theſe Perſons apprehend; for when the Blood is in Fault, and no Care has been taken to amend it in the Cure, the common Conſequence is only, that it breaks out again.

CHAP. XVIII.

For Over-wearineſs.

WHEN a Horſe has been inconſiderately rode or worked; and no right Care taken to recruit Nature by good Food or Reſt, he will be jaded, poor, diſpirited, and ill-looking; and in wrong Hands may be utterly loſt or ſpoiled. In this Caſe he will not eat at all, or not enough; or when he is brought to that his Food will do him little Service. In this Exigence Recourſe muſt be had to Medicines, before he will have any real Benefit from his Provender; and what I have found to anſwer this Purpoſe, better than any other Preparation, is the following Drench. Mix in half a Pint of white Wine half an Ounce of Venice Treacle, and half a Dram of Powder of Saffron; give him this every Night for four Times. It will warm and ſtrengthen Nature in every Part; he will recruit in Strength and Spirit during the Night, and riſing in the Morning from a good Reſt he will eat freely and heartily.

He muſt have choice Food, clean ſoft Water, and gentle Exerciſe, and leſs than a Week will recover him.

CHAP. XIX.

For inward Heat.

IT may always be perceived that a Horſe is out of Order by his own Uneaſineſs. If he be reſtleſs and faint, without any ſeeming Cauſe, and if, upon putting a Hand in his Mouth, his Breath is found to be hot, and his Palate and Tongue inflamed, give him the following.

Mix together a Pint of new Milk, two Ounces of Honey, three Ounces of ſweet Oil, and half a Scruple of Salt Prunella. Give him this every Morning, and keep him an Hour after without Food, repeat it till he is recovered. Three Doſes uſually perfect the Buſineſs, if not he may take more.

CHAP. XX.

For a ſcurfy Skin.

ALL Creatures are liable to Foulneſs of the Skin, when they are not taken good Care of: this is ſometimes attended with other Diſorders, ſometimes not.

When there is no other Complaint joined with it, the Remedies are to be only external. Then proceed as follows.

Make ſome very ſtrong Soap Suds, and put in ſome Vinegar, and ſome Powder of white Hellebore.

Firſt clean the Horſe well dry; then rub him all over with a Bruſh, wet with the Soap Suds, and then waſh him all over with the ſame, by throwing ſome over him, working it in with the Hands and rubbing with a coarſe Cloath.

After this let him be taken in and dried thoroughly, and give him ſome Food and clean Litter.

Mix up a Pound of Flower of Brimſtone, a quarter of a Pint of Oil of Turpentine, and as much Hog's Lard as will make the whole into an Ointment. Rub him well with this an Hour after he is thoroughly dry from the waſhing.

The next Day boil a quarter of a Pound of white Hellebore, and a Pound of Dock Root, in a Gallon and half of Water. Make this into Suds, by beating it up with a good Quantity of Soap, and waſh him with it. Then anoint him well with the ſame Ointment, as before.

Repeat this every Day for ſeven, eight, or nine Days, according to the Nature of the Complaint, and he will be cured: laſt of all waſh him well with the Suds, without anointing him after it.

This is certain to prove a Cure, if there be nothing but the outward Complaint: but when it has proceeded from bad Food, bad Water, and ill Management, as well as Uncleanlineſs, then the ſame outward Method is to be uſed; and he is to have Flower of Brimſtone and Powder of Antimony inwardly, as we ordered in the laſt Receipt.

There is no Need to alter the Medicines when the Deſign is the ſame, and there is no Way ſo good of giving them. All External Foulneſſes are to be cured with Eaſe and Certainty; and in a very little Time in this Manner.

CHAP. XXI.

For ſore Heels.

SET on an Earthen Pipkin, with a Quart of freſh Urine. Put to this an Ounce of Roman Vitriol, and four Ounces of green Copperas, let theſe melt, and then put in the Gall of an Ox, and a quarter of an Ounce of Oil of Vitriol. Rub the ſore Part gently with this every Morning and Night till it is well.

Then waſh it very clean with Soap Suds, and keep it clean from time to time for Fear of a Return.

If there be a great Running from the Part

after the firſt two Days, put in a quarter of a Pound of Alum to the Liquor.

For a Cold caught at Graſs.

This is not dangerous in itſelf, but ill Management may bring it to be fixed, and to have the worſt Conſequence. Timely Care ſoon remedies it; and the proper Courſe is this. Set on a Pipkin with a Pint of Ale, and half an Ounce of Liquorice Juice, commonly called Spaniſh Liquorice. Stir it about, and when the Liquorice is thoroughly diſſolved take the Horſe up, and give it to him early in the Morning: ride him half an Hour ſoftly after this; and then turn him out.

Repeat this every Day till he is cured, which is generally in a Week.

CHAP. XXII.

For the Cholick.

THE Horſes which are kept with great Care are leſs ſubject to the Cholick than others; but none are exempt from it entirely: it is a very common Complaint in the Farmer's Stable; and when it is not properly managed in Time will frequently be attended with very bad Conſequences.

The moſt uſual Cauſe of this Diſorder is the feeding upon coarſe green Food: let the Farmer therefore, when he perceives this Diſeaſe coming on, change the Food of the Horſe; and give him ſome warm Bran and Water, with a few Drops of Oil of Juniper.

Often this alone proves a perfect Remedy; but when it does not anſwer Expectation let the Farmer loſe no Time, but give him the following Glyſter.

Boil two Handfulls of Mallow Leaves, Stalks, and Roots together in three Quarts of Water, till it comes to two Quarts, then ſtrain it off. Set on the clear Water again, with a quarter of a Pound of Caraway Seeds; and a quarter of a Pound of brown Sugar, let it boil up two or three Times, then ſtrain it off, and add to it a quarter of a Pint of ſweet Oil, and a Spoonful of Oil of Turpentine. Let this be given as a Glyſter and walk him after it.

Two Hours after this is come away give him three Drams of Philonium Romanum, diſſolved in a Pint of warm Water, as a Drench. This very ſeldom fails.

If it does not anſwer by the next Morning repeat the Doſe. Keep him from bad Food, and give him warm Water with ſome Bran to drink, and he will perfectly recover.

CHAP. XXIII.

For the Convulſions in the Bowels.

THIS is a Name by which the Farriers and others concerned in Horſes expreſs a Degree of the Cholick much worſe than the preceding, and often very dangerous.

The Farmer will know it by theſe Signs. The Horſe ſtretches out his Legs, his Neck, and his Belly at Times; he rubs himſelf againſt the Walls; ſtamps upon the Ground violently with his Feet; and lies down and gets up again many Times together. His Belly looks ſwelled; and in the Beginning of the Diſorder his Mouth is very hot; afterwards it is cold; and then he is in great Danger.

Firſt bleed him moderately; then give him the ſame Glyſter as laſt directed, only adding to it a quarter of a Pint of Gin.

Diſſolve one Dram of Philonium Romanum, in half a Pint of Mountain Wine: add to this a quarter of a Pint of ſweet Oil, and two Tea Spoonfuls of Spirit of Hartſhorn, give him this as a Drench; and ride him or walk him ſoftly after it.

If this does not anſwer in three Hours. Grate a couple of Nutmegs, put them into a quarter of a Pint of Gin: add a quarter of a Pint of ſweet Oil, and one Dram of Powder of Saffron.

Give him this and walk him ſoftly.

If there be no Amendment repeat the Glyſter.

Then give him theſe two Drenches alternately once in four Hours, till he is well. I have ſeen more than one Horſe loſt by this Diſeaſe for want of Care, but never knew this fail.

CHAP. XXIV.

For Cracks about the Feet.

WHEN this Diſorder is taken in the Beginning, it may be very well cured by the Method we have already directed for the Cure of ſore Heels; but when it comes to an inveterate Height, and the Cracks are deep, and their Edges hard, it is to be treated in a different Manner, and great Care muſt be taken or there will be no ſound Cure.

To this Purpoſe, boil together a good Quantity of Marſhmallow Roots and Bran in ſome Water, and ſtraining this off beat it up to a thick Lather with Soap. Let the Heels all about the Cracks be thoroughly ſoaked and waſhed with this: and then dry them.

Make the following Ointment. Set on an Earthen Pipkin with a quarter of a Pound of Hog's Lard, and the ſame Quantity of Venice Turpentine. When they are melted throw in half an Ounce of Bees-wax ſliced thin, and when that is melted duſt in half an Ounce of powdered Verdigreaſe. Stir it all very well together; and when it is mixed take it from the Fire, and ſtir it now and then till it is cold, that the whole may unite thoroughly.

When the Heels are dry from the waſhing, anoint them very thoroughly and very carefully with this, both on the Edges and within: then ſpread ſome of it upon Leather, and wrap round the Heels. Let this be kept on by tying; and not removed till the next Morning: then let the whole Dreſſing be repeated as at firſt, waſhing, anointing, and covering them up. Let this be repeated every Day, and there will be a ſpeedy Amendment, and in ſome Time a laſting Cure.

CHAP. XXV.

For ſwelled Heels.

THIS is an Accident to which many Horſes are liable that are kept in Stables, when they have no other Complaint whatſoever. Bleeding is ſerviceable, and it is no Way ſo well performed as by Leeches upon the Part.

For this Purpoſe there is no Need of that Trouble that is taken in bleeding our own Species this Way, for Nature will teach the Leeches to do it. In a Morning let the Horſe be led into a Pond that is ſhallow, and has a good many of them in it. Let him be kept ſtanding there ſome little Time, and there will a good many of them faſten on him of themſelves. There let them take their Chance: they will preſently make a good Bleeding, and the Horſe will ſoon recover without any farther Trouble or Concern.

CHAP. XXVI.

For a Strain.

DISSOLVE two Ounces of Caſtile Soap in as much Spirit of Wine as will do to melt it: the Soap muſt be cut into thin Slices, and put into a Jar with the Spirit of Wine, and ſet in a warm Place. When this is diſſolved put in Half an Ounce of Camphire; that will melt preſently, and then the whole will be fit for Uſe: it is a Kind of Opodeldock, and will anſwer all its Purpoſes. Let the ſtrained Part be rubbed with it very well with a warm Hand every Night and Morning, till the Cure is compleated.

CHAP. XXVII.

For running Eyes.

THE Eyes of Horſes are the Seat of many Diſtempers; ſome of them very difficult to be removed, and ſome requiring the manual Operation of the Farrier: but there are others leſs violent, that yet are troubleſome; and may, if not taken into timely Conſideration, grow to Danger: this of Running is one of thoſe, which may always be cured by the timely Uſe of the following Water.

Take four Handfuls of Ground-Ivy, cut it ſmall, and then beat it in a Marble Mortar.

Boil ſix Eggs hard, chop the White to Pieces and put to the Ground-Ivy, then beat them again.

Then put in Half a Pint of Mountain-Wine, and a Quarter of a Pint of Roſe-Water; and add an Ounce and Half of White Vitriol, and the ſame Quantity of White Sugar Candy firſt beat to Powder in another Mortar. Beat all theſe well together, and then put them into an earthen Pan. Strew ſome Baſket Salt, about an Ounce, over them, and covering the Pan ſet it in a Cellar to remain ſix Hours.

Then make a Bag of thin Flannel like a Jelly-Bag, hang it up and ſet a Pan under it. Pour in all that is in the Pan, and there let it remain till the whole Liquor is gone through without ſqueezing.

Put this up in a Bottle, and every Morning and Evening drop ſome of it into the Horſe's Eyes, and rub them gently with it, dipping the End of a ſoft Feather into it for that Purpoſe. In a few Days it will make a Cure.

CHAP. XXVIII.

For a Film growing on the Eyes.

BOIL an Egg hard, ſeparate the Yolk and chop the White to Pieces. Mix with it ſome Baſket Salt, and put it into the Shell of another Egg that can be kept whole, and ſet it over the Fire. Let it ſtand till it will come to a Powder.

Mix this with two Ounces of Honey and three Grains of White Vitriol in Powder. Put this a little at a Time into the Eye with a Feather, and it will often make a perfect Cure.

This muſt be done as ſoon as the Diſeaſe ſhews itſelf; for it is not to be depended upon afterwards.

CHAP. XXIX.

For Cramps.

HORSES are ſubject to Cramps as well as we; and they are very painful. They are diſcovered by the Creature's Uneaſineſs, and by the drawing up of his Limbs: the Cure is this.

Put into a large Bottle a Pint and Half of Vinegar and a Pint of Oil; ſhake them well together; then wet a Woollen Cloth well with them and wrap it round the Limb. If the Cramp do not go off before this is dry, repeat the ſame Thing, wetting the Cloth well again, and it rarely fails to compleat the Cure.

CHAP. XXX.

For the Anticor.

THIS is a Pain in the Breaſt of a Horſe, often very troubleſome, and frequently the Fore-runner of Danger. It riſes from the eating too great a Quantity of rich freſh Food: as when a Horſe has been turned looſe at once into a Clover Field and left to himſelf, or the like: the Cure is this.

Firſt bleed him moderately; and then give him the Aloe Purge we have before directed. If he is not much better let him be blooded again the Day after, and the Purge repeated, as there may be Occaſion, and all the Time let him have moderate wholeſome Diet, and ſome Exerciſe.

This Diſorder in Horſes is very like a Surfeit in our own Species, and is to be cured in the ſame Manner: nothing is required but cooling

and

and opening the Body: and if it be not done the Diſorder will gather Strength, and much worſe will follow.

The Farmer will eaſily know by the Horſe's going, and his Motions of various Kinds, whether he is growing worſe or better after the firſt Doſe and the firſt Bleeding. If he faulter in his Legs, and have a Stiffneſs in his Neck that he can ſcarce bow it down, all is going wrong: if he take frequent Tremblings, it is worſe: the Bleeding muſt then be repeated immediately, and the Purge be given every other Day till he is well. The Quantity of Blood loſt at two, three, or four Bleedings upon ſuch an Occaſion, will never do the Creature any Harm; and the Cure entirely depends on it.

CHAP. XXXI.

For Sickneſs at the Stomach.

THIS Diſorder is uſually owing to a great deal of Provender; or to the eating freſh Meat too careleſsly. I have ſeen a Horſe from an over-feeding upon Clover caſt up all he takes both of Food and Water; and in this Manner he will go on to his Deſtruction, if not timely remedied. The Cure is this.

Make a Quart of Ale hot, and diſſolve in it Half an Ounce of Venice Treacle, a Quarter of an Ounce of Philonium Romanum, and a Dram of powdered Cinnamon. Give him this as a Drench; and if it ſtays upon his Stomach, give him an Hour afterwards a Feeding by Hand of ſmall Bits of Bread, and a very little Lock of Hay between them. This will continue upon his Stomach, and he will recover.

If the Drench did not ſtay upon his Stomach, give him the following. Heat half a Pint of Red Port Wine with a Lump of Sugar: put into a Baſon three Drams of Salt of Wormwood, ſqueeze in four Lemons, and ſtir it about till the Salt is diſſolved: then when the Wine is boiling hot ſtrain this to it, and give it him for a Drench. This will be ſure to ſtay upon his Stomach, if the other does not; and afterwards he is to be fed as before directed.

CHAP. XXXII.

For the Yellows.

THIS is a Diſorder ariſing from an overflowing of the Gall, and it may be called the Jaundice in Horſes; for it ariſes from the ſame Cauſe as that Diſeaſe in our own Species; and is to be cured by the ſame Kind of Medicines.

This Diſorder firſt ſhews itſelf by a Yellowneſs in the Whites of the Horſe's Eyes. Then the Skin of the under Part of his upper Lip next to his fore Teeth is tinged yellow; and then he grows faint and unable to perform his Buſineſs. He will fall down as he is in the Stable, be covered with Sweat as he ſtands ſtill, and often ſhiver.

In this Caſe beat in a Mortar a Hat Crown full of freſh Celandine; add to this four Ounces of Powder of Turmerick and a Pint of White Wine. When all is well beat together preſs out the Juice, and put to it in a large Bottle one Dram of Powder of Saffron, and the clear Juice of four Lemons. Shake all well together.

Bleed the Horſe in the Neck moderately; and an Hour after give him for a Drench a Pint of hot Ale and a Quarter of a Pint of this Mixture. Let the ſame be repeated every Night and Morning till he is perfectly recovered; giving him moderate Exerciſe.

CHAP. XXXIII.

For the ſwelling of the Spleen.

THIS is a Diſorder which renders a Horſe feeble and untractable: he faints in the Stable, loaths his Food at ſome times, and ſnatches at it voraciouſly at others; and he is frequently looking to his left Side, lying down upon it, and rubbing it againſt any thing.

The Remedy for this is to be ſought in the Fields: the Herb Agrimony is a certain Cure: but it muſt be taken for ſome Time. The Diſorder riſes from an Obſtruction in the Spleen, according to its Name; and this Herb is a certain Cure for all Complaints of that Kind.

Gather a good Quantity of this Plant freſh out of the Fields, and cut off the tender Tops. Beat theſe in a Mortar, and add a little Sugar, make them into a Conſerve, and ſet this by.

Then pound the reſt of the Plant, and mix ſome Beer with it by Degrees as it is beating: and when it is all a Maſh preſs out the Juice.

Roll up a Ball of the Conſerve, and rubbing it over with Butter give it to the Horſe in the Manner of a Pill. After it give him Half a Pint of the Juice preſſed out as before directed and made warm.

Let this be repeated every Morning and Night; and give him moderate Food and good Exerciſe. He will not be able to bear the Exerciſe well at firſt, but he will do better daily; and by that it will be ſeen that he is growing well: the Courſe muſt be continued till he is quite recovered; which will be known by his leaving off rubbing and looking at his left Side.

CHAP. XXXIV.

For the Heat of Urine.

THIS is a Diſorder in a Horſe, the ſame with the Strangury in our own Species; but it is to be cured more eaſily if taken in Time. I have obſerved it very often in Autumn, and ſcarce at all any other Seaſon of the Year; and I am convinced it is owing to certain Inſects the Cattle of many Kinds eat at that Time, in cropping the young Shoots of Trees, Shrubs and Hedges.

Every one knows that the taking of the ſmalleſt Quantity of the Drug called Cantharides or

Spaniſh Flies, occaſions a terrible Stoppage and Heat of Urine. Cantharides are a Kind of green Beetles found upon the Buſhes in SPAIN; and we have the very ſame Kind, but ſmaller, in ENGLAND. They live among the young Shoots of Trees at that Seaſon; and now and then are ſwallowed up by the Horſes that crop them: in this Caſe a Heat of Urine comes on, and the Horſe is in terrible Pain: the Part ſwells and inflames, and he is continually wanting to make-water, though he can make only a Drop or two. His Blood is enflamed at the ſame Time; and if due Care be not taken, the Conſequences will be dangerous.

Chop to Pieces four Pounds of the Roots of Fennel, ſix Pounds of the Roots of Mallows, and two Pounds of the Roots of Parſly. Set them on to boil in a Copper with eight Gallons of Water, and put in three Pounds of French Barley. Let them boil heartily together for half an Hour, ſtirring them well about: then when the whole is a little cooled ſtrain off the Liquor, and ſqueeze it hard from the Ingredients.

Give the Horſe equal Quantities of this Liquor and Milk mixed together warm for his Drink; and let him drink as much of it and as often as he will.

The Heat of his Blood will make him thirſty, and the Quantity of this Liquor he ſwallows will ſoon be a Cure.

If the ſame Diſorder happen at any other Time of the Year, and from any other Cauſe, this Medicine will alſo cure it.

CHAP. XXXV.

For Difficulty of Urine.

THIS is a Diſorder the Farmer muſt be careful not to confound with the other; for they ſomewhat reſemble one another; though they have different Cauſes, and require a different Method of Cure.

The former is an Inflammation of the urinary Parts; but this is only an Obſtruction by Gravel.

It is ſeen by the Creature's ſtraining very hard to void his Urine, and often without being able to make any. In this Caſe let the Part be examined; and if there be no Heat or Inflammation, it is a Sign this is the Caſe. Alſo if the Diſeaſe be of more Continuance; and if the Horſe can ſometimes void a great deal. All theſe are Signs it is an Obſtruction, and not an Inflammation; and the Farmer being ſure of this by the Symptoms is to proceed thus.

Let him boil a large Quantity of French Barley in Water, and mix the Liquor with all the Water he drinks; and let him give every Morning the following Drench. Take Juice of Arſmart and Parſley-pert, of each a quarter of a Pint; Sweet Oil ſix Spoonfuls, and Oil of Turpentine half a Spoonful; give it warm, and an Hour after let him drink plentifully.

CHAP. XXXVI.

For bloody Urine.

THIS is a Diſorder that ſhews itſelf very evidently; ſo there can be no Miſtake of its Nature.

It is generally owing to over-working; and this will oftenеſt be the Conſequence, when with a great deal of Work the Creature is fed poorly.

The Remedy is this.

Bruiſe a large Quantity of that wild Craneſbill, which is called Herb Robert: ſqueeze out the Juice, and add to every Pint of it half a Dram of Alum powdered, and two Drams of Dragons Blood. Give half a Pint twice a Day till he is well.

CHAP. XXXVII.

For the Vives.

THIS Diſorder is a Swelling in the Kernels, between the Chop and the Neck of a Horſe. It generally proceeds from Cold; and when it is attended with much Inflammation may be dangerous. The Remedy is this.

Bleed him largely, and pour into his Ears Juice of Rue mixed with a good Quantity of Pepper. Tie the Ears round to keep it in; and if he be not better the next Day repeat the Bleeding, and afterwards give him the common Purge ſet down before.

CHAP. XXXVIII.

For Soreneſs in the Noſtrils.

THIS is a Diſorder that is very troubleſome to Horſes kept at Graſs; and they are found to be moſt ſubject to it which are fed in low wet Grounds. It is to be cured by an outward Application in this Manner.

Bruiſe ſome Plantain and preſs out the Juice. To a Pint of this put a Pint and a Quarter of Vinegar, and two Drams of Alum. Mix all very well together; and firſt waſh the Part clean: then anoint and rub it gently with this Liquor. Repeat this every Day once or twice; and if it do not take ſpeedy Effect put in more of the Alum: according to the Nature of the Diſorder more or leſs will be required; but this is generally ſufficient.

CHAP. XXXIX.

For bleeding at the Noſe.

THIS is an Accident to which Horſes are liable, in the ſame Manner as our own Species; but it is uſually much more violent in them than in us. It is to be treated according to the Degree of it in a different Manner.

If it be very violent the Horſe muſt be immediately blooded in the Flank, and while he is bleeding the following Mixture is to be prepared. Bruiſe in a Mortar equal Quantities of Clown's Allheal, and Wood Betony, add to it a little Salt, a little Allum, and ſome Colcothar of Vitriol; when all is beat together thruſt ſome of it up the Noſtril that bleeds, and keep it firmly to the Place till it is ſtopped.

As there may be Danger of its breaking out again in the Night, there ſhould be a Quantity of the ſame Mixture thruſt up in the Evening, and by Means of a Bandage properly made, it ſhould be kept in.

When the Occaſion is leſs violent the Bleeding may be truſted alone; and when moſt ſlight of all the Herbs pounded without any Addition will anſwer the Purpoſe.

CHAP. XL.

Of Diſorders of the Mouth.

A Horſe is ſubject to various Diſorders of the Mouth, which are known by different Names, and ſome of theſe require the Hand of the Farrier; but the greater Part may be cured by the Farmer himſelf.

The Growth of bad Fleſh over the Gums, which is called the Lmapaſs, is to be remedied by burning with a red hot Iron, and for this the Smith or Farrier is fitteſt, becauſe Practice is the beſt Director. But for thoſe Cracks and Warts in the Palate, and all the little Puſtules and Inflammations to which it is liable, the Remedy is this. Gather a good Quantity of freſh Leaves of Wormwood, ſtamp them and preſs out the Juice, mix an equal Part of this and of Ægyptian Ointment, and ſtir theſe well together; then, with a Piece of Rag tied to the End of the Scuer, rub over the ſeveral Parts that are ſore, and they will be cured in a few Times dreſſing. Swellings under the Tongue, are cured in this Manner.

CHAP. XLI.

For looſe Teeth.

IT ſometimes happens that the Teeth of a Horſe will be ſore, ſo that he cannot chew his Meat, and at Times they will be looſe; theſe are great Inconveniences, and muſt be remedied ſo far as may be, as ſoon as they are perceived. For this Soreneſs in the Teeth uſe the following Waſh.

Gather ſome Leaves of Wood Betony, and boil them in Ale till it be very ſtrong of them: then ſtrain it off, and mix with it an equal Quantity of the ſharpeſt Vinegar. Heat this as hot as can be well borne, and waſh the Gums about the Roots of the Teeth with it every Night and Morning: at the ſame Time feed the Horſe for ſome Days with the ſofteſt Food that may be, and then leave him to his common Life again.

This generally proves a Remedy for Soreneſs of the Gums; but when the Teeth come to be looſe the Caſe is much worſe. In this Situation after the Gums have been well waſhed with the Liquor before directed, bring in ſome freſh Leaves of Elecampane, and rub the Teeth and Gums with them: ſometimes this will take Effect. Let the Horſe be blooded, and let him be fed for ſome Days with ſoft Meat; as boiled Oats, and the like Things: for the not forcing them is a very great Article in the Cure.

CHAP. XLII.

For Foundring.

EVERY one who is at all accuſtomed to Horſes knows this terrible Complaint. The Cauſe of it is commonly hard Service and bad Management; from theſe joined together the Creature gets a Diſorder in the Feet, ſo that he is hardly able to ſtand upon them. He will quake and totter; and will be ſcarce able to keep up in going.

This is the Nature of foundering; and the Farmer ſhould have a particular Care of thoſe Things which occaſion it. The ſetting up a Horſe when very hot in a cold Stable without Litter is one Cauſe. The riding him into ſhallow Water, and letting him ſtand with his Feet under it a conſiderable Time when very hot, is another; and many other careleſs Tricks of the ſame Kind may have a like Effect.

But beſides theſe there are other Accidents that will occaſion it: as the wearing ſtrait Shoes, and travelling a great deal upon very rough and hard Ground.

Sometimes a Horſe is foundered on all his Feet, which commonly happens from the ſtanding in Water when hot, or ſome ſuch Accident; but more uſually he is foundered only on his fore Feet: ſometimes the Foundering is only on the hinder Feet; but this is much leſs common.

When he is foundered on the fore Feet he reſts upon the hinder ones as much as poſſible, and is careful how the fore Feet go to the Ground: and in the ſame Manner, when the hinder Feet are affected, he reſts himſelf almoſt entirely on the fore; not letting them come down hard at any Time. This Complaint is alſo known by his ſeeming weak behind as he goes.

The Method of Cure is this. Let the Horſe be taken to a careful Farrier as can be found, and let the Owner ſtand over him to ſee his Operations. He is to pare away the Hoof gently till he comes to the Quick, and then to bleed the Foot in four or five Places at what they call the Toes. This being done, put into an earthen Pipkin equal Quantities of Tallow and yellow Roſin; let them melt together perfectly: then lay on a Quantity of this upon every Part whence the Blood came.

This done, let hollow Shoes be put on; and let another Pipkin be ſet on with equal Quantities of Tallow and Tar; when theſe are well melted together put in ſome Bran, and ſtir all again. Then make this very hot, and ſtop the Hollows of the Shoes with this.

Let this be repeated every Day for eight Days, during which Time keep him quiet and give him moderate Food.

After

After this bring him to more Exerciſe by Degrees.

Sometimes this Method will make a Cure, but not always; for there are Stages of this Diſorder which nothing can relieve.

CHAP. XLIII.

For Wind-Galls.

WIND-GALLS are a Diſorder of the Feet, brought on by travelling long together in hard Ways. They are little ſoft Swellings containing a Kind of Jelly, and appearing on each Side of the Fetlocks. The Remedy is very ſhort and eaſy. They muſt be opened to let out the Matter, and then dreſſed with a Piece of black Pitch ſpread upon Leather, by Way of Plaiſter.

The common Practice is to prick them with a Nail, or ſome ſuch Thing; and this is directed in thoſe Books which treat of theſe Complaints: but this is a very injudicious Practice. Let the Farmer in all theſe Caſes follow the Practice of the Surgeons; for the Buſineſs to be done is juſt of the ſame Nature, and they have beſt ſtudied how to perform it. When they are called to open a Swelling, they do not perform this by pricking it, or making a ſmall Hole for the Matter to come out; but they cut it with their Lancet all the Length; and ſometimes again croſs-wiſe: this lets out all the Matter, and gives the Dreſſing its full Power. In the ſame Manner in theſe Wind-Galls, and all Complaints of the like Nature, let the Farmer open the Swelling from Top to the Bottom; and when the Matter is fully and entirely out then put on the Dreſſing. In this Caſe the whole Malady is remedied at once; for the Horſe is well by that Time the Plaiſters come off, which they will of themſelves in a few Days.

I have heard Farmers complain of theſe Wind-Galls returning again and again after pricking; and in this Caſe they will diſorder the Feet of a Horſe at length to his Deſtruction; but it is all owing to this Method of pricking inſtead of lancing: in that Caſe all being cleared there is no Fear of a Return; but when the Swelling is only pricked a Part of the Matter is left behind; the Hole preſently fills up, and then there is a freſh Gathering; and this as often as it is diſcharged in that wrong Manner.

CHAP. XLIV.

Of the Anbury.

THIS is a Kind of Swelling or Puſtule, that appears like a bloody Wart upon different Parts of the Body of a Horſe, and is owing to Accident, without any Diſtemperature in the Blood. The Cure is this.

Bruiſe ſome Plantain Leaves, and preſs out their Juice. Mix together three Spoonfuls of this, three of Vinegar, and two of Honey; and ſtir in half an Ounce of powdered Allum. Burn down the Wart with a red hot Iron, cloſe and even to the Body; and then anoint it with ſome of this Mixture. Repeat this anointing Night and Morning till it is well; and it will never return.

This is a ſure Method when there is no Diſorder in the Blood; but as this Diſtemper is ſometimes attended with a bad State of the whole Maſs, a further Caution is then neceſſary. The Farmer may be ſatisfied nothing more is amiſs, if the Aubury is perfectly and ſoon cured by this Method, and does not appear again in other Places, and if the Horſe appear clean and healthy: but if the Complaint riſes in one Place, when it is cured in another; and eſpecially if at the ſame Time the Creature be groſs, full of foul Humours, and have other Diſorders upon the Skin, then there muſt be Care taken of the whole Maſs, as well as of theſe ſingle Eruptions.

In this Caſe let the Horſe be firſt blooded; then let the ſeveral Anburies be burnt down and dreſſed in the Manner we have directed, and let there be Flower of Brimſtone and crude Antimony in Powder ſprinkled amongſt all his Food.

During this let the Owner watch the Appearance of others breaking out; and always burn them down as they come. By this Method there will be a perfect and laſting Cure.

CHAP. XLV.

For a general Decay.

SOmetimes a Horſe will fall into a general Decay, without any apparent Cauſe: he will be weak and faint, and his Coat will grow rough, and he will loſe his Fleſh till he ſeem dying and irrecoverable. This is to be remedy'd, if taken in Time, by the following Medicine:

Take ſix Pounds of fine Wheat Flour, mix with it two Ounces of Aniſeeds in Powder, and three quarters of an Ounce of Cummin in Seed, alſo powdered; Seeds of Carthamus powdered, a Dram and half; Fenugreek-Seed an Ounce and half, Flour of Brimſtone two Ounces, Powder of Vipers three Ounces, Powder of Saffron one Dram, and Powder of Cochineal a Dram and half.

Mix all theſe Powders perfectly together, ſtiring them about; and then put to them a Pint of Sallad Oil, a Pound and half of Honey, and two Quarts of White Wine.

Work all this into a Paſte with the Hands, adding a little Flour, if it be too ſoft, and a little Wine, if it be too hard: when it is well wrought, make it up into Balls of the Bigneſs of a Man's Fiſt; and give the Horſe one of theſe every Morning in the Water he is to drink, and the ſame every Evening.

Let the Water be cold, and if he diſlike it, give him no other. When he is thirſty he will take to it; and the getting him once to drink it is all the Difficulty, for he will afterwards like it better than any other. In this Manner he will be perfectly cured in three Weeks; and will recover his beſt Looks, Fleſh and Spirit. Care is to be taken that he be kept, during the Time, upon good Food, and have gentle Exerciſe, but never to fatigue him; and that he lie clean and dry.

BOOK XIII.

Of COWS and OXEN.

SECT. II.

The INTRODUCTION.

THESE Creatures are not liable to ſo many Diſorders as the Horſe; but there is nothing of greater Importance to the Farmer than a right Knowledge of thoſe to which they are ſubject, and the beſt Methods of curing them. A diſtempered Cow or Ox are worth very little. Moſt of their Diſeaſes, as they are of a more ſimple Nature than thoſe of the Horſe, are eaſier of Cure: but there are ſome which we ſee mock all the Art of Phyſic, and all the Rewards a Government can propoſe for deviſing a Remedy. The fatal Diſorder that has now raged ſo many Years is a terrible Inſtance. No Medicines yet diſcovered are able to cure, nor any Regulations to put a Stop to it.

We have examined this Matter with all the Attention the Nature of ſo weighty an Affair demands; and hope we ſhall be able to propoſe ſomething on that Head worthy the Attention of the Farmer and of the Public. We ſhall begin with Diſeaſes of a leſs terrible kind, that the Huſbandman may be led, by Degrees, to the moſt important and difficult.

CHAP. I.

For the Fever.

THE Farmers find their Cows and Oxen ſubject, like themſelves, to Fevers; and theſe, though they generally will go off kindly by Aſſiſtance, often are of very bad Conſequence when neglected. The moſt common Occaſion of them is a Surfeit, and ſometimes they will ſeize them, as ourſelves are ſeized by Sickneſs, without any viſible Cauſe.

The Signs are theſe: The Creature foams at the Mouth and hangs down the Head; the Eyes look heavy, and the whole Body trembles: and it frequently groans very mournfully and heavily. It is hot and reſtleſs, and does not care for Food, but is continually deſiring to drink. Theſe are the genuine Signs of Fevers in Cattle.

The Farmer muſt take Care that he confound them not with the Symptoms of other Diſeaſes, for this is the general Miſtake. Let him remember, that as theſe are the proper Signs of a Fever, ſo there are no other but theſe that are to be conſidered plainly as ſuch.

Many other Diſorders will have the Symptoms of a Fever joined with thoſe that are peculiar to themſelves; and, in that Caſe, the Farmer is to be upon his Guard accordingly: he muſt firſt diſtinguiſh the Diſeaſe truly, or all Advice and all Knowledge of Remedies will be fruitleſs.

In Cattle, as in ourſelves, many, nay moſt other Diſorders, are attended with a Fever; therefore it is natural that feveriſh Symptoms appear with them: hence let the Farmer, when he ſees theſe Signs here deſcribed, in a Creature of this Kind, firſt examine whether there be not, together with them, ſome belonging to thoſe Diſorders, we ſhall deſcribe in the ſucceeding Pages: if there be, then he is to level his Remedies at the Diſeaſe they indicate; thoſe Signs of a Fever being ſymptomatic: and as the other Diſorder is the real Cauſe of them, when that is removed they will go off.

This is the Conduct he is to obſerve when there are the Signs of a Fever, and thoſe of ſome other Diſeaſe together; but when there are thoſe of a Fever only, that is, thoſe we have here deſcribed, and no other, he will find the following Method of Cure generally ſucceſsful.

Firſt bleed the Creature: and as to the Quantity, that is to be guided not only by the Nature of the Diſorder, but by the Condition of the Body: if it be a very violent Fever, more Blood is to be taken away; if leſs violent, leſs: and if it be an Ox, he may be blooded much more freely than a Milch Cow. A Quart of Blood may be very properly drawn from the former; but it is a general and very wiſe Rule, that there never ſhould be more than a Pint taken from the latter. Though, if the Symptoms encreaſe, the Bleeding may be repeated after four and twenty Hours.

When the Creature has been blooded, ſet it up warm, and give it no Victuals.

Boil, in ſix or eight Gallons of Water, a Baſket-full of Plantain-Leaves and Roots, and half a Dozen Handfuls of Agrimony, ſtrain them off, and let the Creature drink of this, warm, as often as can be.

The next Day give a Quart of Ale, with half an Ounce of Venice Treacle in it; and repeat this once in eight Hours.

Give ſome very freſh Hay, ſprinkled with cold Water, after all this; and, by Degrees, the Beaſt will grow well.

During all the Time of the Illneſs, the Lips muſt be frequently rubbed and cleaned, for they furr up and grow foul with the Heat of the Diſorder; and unleſs this Care be taken, it will not eat or drink.

Let the Creature be kept up till perfectly recovered, and after that let it be taken ſome Care of ſeveral Days.

CHAP. II.

For binding of the Body.

THIS is a Diſtemper to which theſe Cattle are very little liable, for their natural Conſtitution is to be looſe; but, for that Reaſon, when it does happen, it is to no Creature ſo dangerous, nor is there any Diſorder in Cattle that requires ſo critical a Method of Cure.

If any of the common Purges that are uſed for Horſes, be given to Cows and Oxen in this Caſe, they ſeldom fail to bring on a Diſorder in the other Extreme, that is much worſe than the firſt; and the Remedy grows worſe than the Diſeaſe.

I have found from Experience that the following is a ſafe and excellent Medicine.

Take a Quarter of a Pound of coarſe ordinary Manna, this Sort is to be bought for a fourth Part of the Price of the fine Kind, and yet for any Uſe it is better. Melt this in a Pint and a half of Ale, put it into a Bottle, and add to it half a Pint of Sweet Oil, and ſix Ounces of Lenitive Electuary. Shake all very well together, then pour out a Gill and half of it: warm this, and give it every Morning and Night till half the Quantity be taken; and then every Morning only till the Remainder is all taken. This never works as a Purge, but it gently produces the Effect, bringing the Creature's Body to a due State and Condition; and as this is brought on gradually, it is ſure to continue. I never once knew a Relapſe after this Cure.

CHAP. III.

Of Looſeneſſes in general.

THIS is a Diſorder to which Cows and Oxen are much more liable than the former, the Condition of their Diſcharges naturally tending to it; and it is for that Reaſon difficult of Cure, if not taken in Time. When it firſt comes on, it affects them no other Way than by making the Diſcharge thinner, while it retains its natural Colour: after this it becomes paler and ſharper, giving the Creature great Pain; and after that the Stools grow bloody.

Theſe are the true Stages of the Diſtemper. The Farmer is to regard them carefully, for there is to be a different Courſe of Medicines for each. We ſhall therefore, after this general Account of the Diſorder, conſider it under theſe three particular Heads, delivering the proper Remedies,

CHAP. IV.

For a common Looſeneſs.

BOIL half a Pound of freſh Roots of Biſtort in two Quarts of Water. Strain off the Liquor, and add to it four Ounces of Whiting, and an Ounce of Diaſcordium, made without Honey: give the Creature half a Pint of this, warm'd and well ſhook up, three Times in the four and twenty Hours, till the Complaint ceaſes. Sometimes a ſingle Doſe performs a Cure; but in that Caſe it will be proper to give another Doſe, Morning and Night, for two Days, to prevent a Return.

CHAP. V.

For a Looſeneſs with ſharp Stools.

IF the former Medicine have not ſtopped the Diſorder; or if the Farmer have not obſerved it till it comes to the ſecond Stage, that is, till the Creature's Stools are ſharp and diſcoloured, then the following Remedy is to be uſed.

Bruiſe to a groſs Powder half a Pound of the dry Root of Tormentill, and boil it in two Quarts of Water to a Quart.

Squeeze this off, add to it a Quart of rough Red Wine: add alſo a Quarter of a Pound of Whiting, two Ounces of Diaſcordium without Honey, and one Ounce of Japan Earth. Shake this very well together. Warm it every Time it is given, and let the Cow have half a Pint of it for a Doſe, three Times a Day, till perfectly recovered.

CHAP. VI.

For a Looſeneſs with bloody Stools.

THIS Diſorder ſometimes comes on at once; but more frequently it is the Conſequence of Neglect, or wrong Medicines given for the others; or of the Violence of the Diſorder, which ſometimes will not be conquered by the very beſt.

The natural Courſe of the Diſorder is this: a ſharp Humour falls upon the Bowels, and the Stools are thin and cutting.

After a Time they wear off the ſlimy Coat of the Bowels, and then what comes away is diſcoloured; and after this they wear the very Inſides of the Guts themſelves, and then come

bloody Stools. This is the laſt and worſt Stage of the Diſtemper, and it is very dangerous.

When it has arrived at this Degree, the following Method is to be taken:

Firſt let the Creature be blooded, but not largely; then prepare this Medicine.

Bruiſe to Pieces half a Pound of dry Roots of Tormentill, ſix Ounces of dry Pomegranate-Bark, and two Pounds of the Leaves and Roots of Plantain.

Boil theſe in three Quarts of Water to two. Then put in two Ounces of Cinnamon pounded: let it boil a few Minutes longer, and then take it off.

Set it by to be cold, and then ſtrain it off: add to this three Ounces of Dragon's-Blood, in Powder, and a quarter of an Ounce of Roch-Allum.

Shake all thoroughly together; and when it is to be given, warm the proper Quantity: this is to be about a Gill and half, and it ſhould be given three Times a Day.

CHAP. VII.

For Looſeneſſes with great Heat of Body.

WE have told the Farmer what are the Symptoms of a Fever in theſe Creatures; and he is aware that they may happen with other Diſorders. A Purging is one of thoſe with which they may happen, and in that Caſe it is not to be treated as a Fever alone, neither is the Diſorder to be conſidered only as a Purging: a due Regard is to be had to both; and the following Medicine being founded on Reaſon, and ſupported by repeated Experience, I ſhall earneſtly recommend for this Purpoſe to the Farmer.

Cut into Slices ſix Ounces of the Root of the Herb called Avens, or Herb Bennet. It is not ſold at the Druggiſts nor at the Market, but it is common on Ditch-Banks. The Flower is little and yellow; the Head is a ſmall Burr; and the Root ſmells like Cloves. Let this be boiled in three Quarts of Water to two Quarts, adding, toward the End of the Boiling, an Ounce of fine Cinnamon, and two Ounces of Chips of Logwood, ſuch as is uſed by the Dyers.

Strain off this Liquor, and add to it an Ounce of Powder of Virginian Snake Root, and a Pint of Red Port Wine.

Give the Creature half a Pint, warm, twice in twenty-four Hours.

CHAP. VIII.

For the Obſtruction of the Liver.

THIS is a Diſorder to which Cows and Oxen are very liable; the Farmers are acquainted very well with the Symptoms of it, though not with the Cauſe; it is what they call by the general Name of an inward Sickneſs.

The Signs by which it is known are theſe; an Uneaſineſs ſenſible in all their Actions; and a Lazyneſs or Unwillingneſs to move. To this is to be added a Scurfyneſs, and harſh Dryneſs of their Lips, and a Dryneſs of their Noſes in a Morning.

This laſt is a very ſingular but very certain Symptom.

When theſe Cattle are well, if they be obſerved in a Morning, there is always a Drop of Dew, like a Pearl, hangs upon the Noſe; but when they are ſick it is commonly wanting. No Diſeaſe ſooner takes the Effect of getting off this Mark of Health, but it is not peculiar to this. If the other Symptoms ſhew that the Diſorder is of that Kind, this joins with them to confirm it; but if not, the Cauſe is to be ſought farther. In Caſe of an Obſtruction of the Liver, the Remedy is this:

Take a Pound of great Celandine, dug up with the Roots, cut it all to Pieces, Leaves, Stalks, and Roots together, and put it into a Pot, with two Gallons of Water, let it boil up a few Minutes; then add half a Pound of Madder Root, ten Ounces of Turmeric, and four Ounces of freſh Roots of Fennel. Boil theſe very well, and then ſtrain off the Liquor.

Get a Hat-Crown full of Wood-lice, they are common enough about decay'd Timber, and under Stones. Pound theſe with a Pint of White Wine, and ſqueeze out the Juice, then add this to the ſtrained Liquor.

Shake this up every Time it is to be uſed, and warm half a Pint of it for a Doſe. It ſhould be given every Night and Morning for ten Days. This is the uſual Time required to perform a perfect Cure: it may be ſooner, or it may require a few Days longer; but the Medicine will hardly fail.

CHAP. IX.

Of bloody Urine.

THIS is a Diſorder to which Cows are very liable, and, if not taken Care of in Time, it is a very fatal one. The Method of Cure is this:

Take the Cow into a warm Houſe, where ſhe is to be kept till cured.

Bleed her about three Quarters of a Pint, and then give the following Medicine:

Gather a Baſket-full of that Sort of Cranes-bill, call'd Herb Robert. Stamp it in a Marble Mortar, and preſs out the Juice; give the Cow a Quarter of a Pint of this every Morning and Night, and it generally will perform a Cure in about three Days.

It is a kind of Specific for the Diſorder, and cures with ſurprizing Quickneſs: but there are ſome Caſes in which other Diſorders bring on this bloody Urine, and then this Medicine does not anſwer.

Let it be try'd only ſix or ſeven Doſes, and if that do not ſucceed, have Recourſe to the following.

Boil in a Gallon of Water a great Quantity of the ſame Herb Robert, and as much Shepherd's Purſe. When they have boil'd well half an Hour, put in a good Stick of Cinnamon; and after boiling a few Minutes longer, ſet it off the Fire. Then ſtrain it and ſet it by to cool.

Diſſolve

Diſſolve in this two Drams of Sugar of Lead, and add one hundred Drops of Spirit of Vitriol.

Shake all well together, and give the Creature a Gill of it cold every four Hours, till the Cure is perfected.

CHAP. X.

For Running of the Noſe.

THIS Diſeaſe which grows to ſuch a terrible Height in Horſes, under the Name of the Glanders, is very ſlight in Compariſon of that, in theſe Cattle. It proceeds from Cold, and the Running is like that from our own Noſes in a like Caſe; only as they hold their Heads down it is not ſo eaſily cur'd, and it will encreaſe upon them to a miſchievous Diſorder in Time, if not ſtopp'd.

Take the Creature up, and let it be kept warm.

Bleed it about a Pint, and then give the following:

Boil a Pint of Ale, and diſſolve in it half an Ounce of Venice Treacle.

Give it warm, and let it be repeated every Night and Morning.

Give the Creature good Provender while under this Method of Cure; and during the taking of the Medicine uſe the following Application to the Part. Melt ſome freſh Butter; and ſtir in as much Flower of Brimſtone as will make it a thick Ointment. Rub ſome of this all over a Couple of Gooſe Feathers, and warm them a little before the Fire; anoint the Inſide of the Noſtrils carefully, but thoroughly, every Morning and Evening with this, till the Diſorder ceaſes entirely.

CHAP. XI.

For Worms.

COWS and Oxen are ſubject to have Worms bred in their Bowels, and they are greatly diſordered by them; they will prevent their thriving, and make them reſtleſs and untractable. The Remedy is this:

Chop to Pieces ſome Savin-Tops, and Leaves of Bear's-foot, mix with theſe a little Salt of Steel, and work up the Whole into a Sort of Paſte with Butter. Divide this into ſmall Balls, and give one of them every Morning early for a Week or longer; keep the Creature without Meat three Hours after the Medicine, but let her drink as much as ſhe chuſes.

If this Medicine do not ſucceed alone, it muſt be aſſiſted in the following Manner:

Diſſolve half an Ounce of black Soap in a Quart of Sweet-wort, and give this every Morning after the Ball of Savin. In this Manner the Cure will uſually be perfected in a few Days.

CHAP. XII.

Of Worms in the Tail.

BESIDE the Worms that breed within the Bodies of Cattle, there are a very troubleſome and miſchievous Kind that breed and live externally in the Tail.

They torment the Creatures out of their Lives, waſte their Strength and Spirits, and keep them in continual pining. They uſually grow lean; their Backs become weak; when they are lain down they are ſcarce able to get up again, and they have a Faintneſs in their Looks and Motions.

When the Farmer ſees a Cow or Ox in this Condition, let him examine the under Parts of the Tail. He will firſt perceive that the Hair is fallen off; then that there are a multitude of little Sores; and, upon further Examination, he will perceive, that the Tail is almoſt eat aſunder in ſeveral Places at the Joints.

This might ſeem to be a natural ulcerated State of the Tail; but it is, in Reality, owing to a Multitude of eating Worms, which will be found eaſily enough upon looking after them. They are occaſioned by Foulneſs of the Tail, which tempts a particular Kind of Fly to lay its Eggs there; or, according to the common Expreſſion, to blow it.

Theſe Worms are hatched from the Eggs, and they live their Time in the Tail amidſt theſe Sores; after which they drop off, and take their Chance upon the Ground, where, if not trodden to Pieces, they harden outwardly, and after a while, they come out a Fly, like the Parent Animal.

There never want a Succeſſion of theſe Tormentors; for the Condition of the Tail draws more Flies to blow it, like Meat that begins to putrify, and thus the Diſeaſe continually encreaſes.

The Farmer thus underſtanding the Nature and Cauſe of the Diſorder, will know how to guard againſt the Accident to which it is owing. And we ſhall next inform him of the Remedy.

It is only in Summer the Diſorder takes its Riſe; though, when once eſtabliſhed, it will continue at all Seaſons.

Therefore as Precaution is in all theſe Caſes eaſier and better than a Cure, let him take Care in Time. We have told him that it is Foulneſs on the under Part of the Tail in Cows, that firſt brings the Flies to them. Nature has ſo diſpos'd the Tail in this Creature, that it is very liable to be made foul. This is an Inconvenience, but it is attended with many Advantages; it is therefore the Buſineſs of the Farmer to remedy the Diſadvantage, which is eaſy, that the Creature, and himſelf in Conſequence, may reap the Benefit.

The Dung of the Cow and her Urine, will be apt to hang upon this under Side of the Tail; and after Calving, there will be alſo greater Inconveniences of the ſame Kind: therefore let a Perſon be employed, once in three or four Days, to clean the Tails of the Milch Cows,

in

in particular in this Part, which will be very eaſy; and of the Oxen, as there may be Occaſion. This will be very agreeable to the Creatures, and were there no other Advantage it would be worth while for this, becauſe the more comfortable they are kept the better they thrive. But if this Care be taken there will be no ſuch Thing as the Tail Worm known. Cleanlineſs will not only prevent the Diſorder, but in the firſt Stages will cure it. The beſt Waſhing is performed by Means of a Bruſh and Soap Suds, and if a few of the Worms ſhould be bred, this will perfectly deſtroy them. We ſhall hope the Farmer will take this Care, and he will need no farther Information; but as a Neglect of this may have happened, or the Diſorder may have ſome Way got footing where he little expects, we ſhall here deliver alſo the Remedy.

Chuſe out a Pound and half of fine freſh and new made Stone Lime. Boil a Gallon of Water, and pour it all at once upon the Lime in a very large Earthen Pan.

It will bubble up in a ſurpriſing Manner. Stir it well togther, cover it up when cold, and let it ſtand all Night to ſettle; there will be a very ſtrong Lime Water, though but a ſmall Quantity of it. In the Morning let it be poured clear off, and kept for Uſe.

Take up the Cows that have the Diſorder, and keep them dry and carefully while they are under Cure.

Make a very ſtrong Lather of Soap Suds in ſoft Water; and firſt of all with Flannels, and afterwards with a Bruſh wetted in theſe Suds, waſh the Tails in every Part perfectly clean; and the more to promote the perfect cleaning of them, cut off the Hair that remains as ſhort as can be.

After the Tails have been thus cleaned and are dry, waſh them in the ſame Manner with this ſtrong Lime Water. Obſerve after four or five Days, whether the Diſorder be cured; if not farther Methods muſt be taken. Once a Day will be enough to dreſs the Tails by theſe two Waſhings, but it muſt be every Time done in this careful Manner, firſt by the Soap Suds, and afterwards by the Lime Water. If theſe fail the following Method is to be uſed.

Stamp a good Quantity of the freſh Tops of Rue and Savin; when they are reduced to a Paſte; add a little white Hellebore and Stone Ocre, both in Powder, and ſome Wood Soot and a little Salt. Beat all this up again, and then mix in ſome Butter. When this is ready, and the Tail perfectly cleaned, let it be ſlit along all the Way down the Inſide, nearly to the Bone, and very thoroughly anointed with this.

If this does not cure in three or four Times, let the Tail be rub'd with a ſmall Quantity of the common blue Ointment, made of Quickſilver, Venice Turpentine, and Hog's Lard.

Theſe ſeveral Methods are to be tried one after another; uſually the firſt ſucceeds, if not, the ſecond rarely fails; but if none will do, the laſt Reſource is to cut off the Tail. But it is beſt to fatten up the Beaſt after this for Sale directly.

CHAP. XIII.

For Boils on the Fleſh.

COWS are ſubject ſometimes naturally to large and painful Boils; and ſometimes they fall into the ſame Misfortune in a ſurpriſing Manner, by Means of a Fly, as in the former Inſtance.

We ſhall conſider theſe Caſes ſeparately.

When a Boil comes naturally on a Cow or Ox, the Thickneſs of the Skin, and the cold Conſtitution of the Animal make them ripen ſlowly, and they alſo heal ſlowly and difficultly afterwards. Nature is, in theſe Caſes, to be aſſiſted in the following Manner. For the ripening of a Boil: take up ſome white Lilly Roots, and boil them in Milk and Water till they are perfectly ſoft. Then lay them hot upon the Boil. Bind them on if that can be done conveniently, if not let a Perſon hold them on till they are cold.

This is to be repeated as Occaſion requires; the oftener the better; and the Boil will ripen and come to a Head.

The opening of a Boil when it is in this proper Condition, may be done either by a Knife, or a red hot Iron, and the general Practice is by the latter Method.

When the Matter is diſcharged, which ſhould be promoted by a Perſon's preſſing it gently, let it be dreſſed with the following Ointment. Put into an Earthen Pipkin half a Pound of Tar, and three quarters of a Pound of Horſe Turpentine; ſet it on a gentle Fire, and as it melts throw in a little Hog's Lard, about two Ounces will be ſufficient. Stir all well together, and dreſs the Part every Day with ſome of this warm, till it is healed.

The other Accident of Boils occaſioned by Flies, is much more wonderful than any thing relating to this Creature, and the Diſcovery of it was made by Mr. De Reaumur, of the Royal Academy of Sciences at Paris, and is delivered in the fourth Volume of his Memoirs, very much at large. The very ſame Thing happens in England, and what we ſee verifies his Accounts.

There is a large Fly that in Autumn teazes the Cattle prodigiouſly. It ſettles upon them, and lays its Eggs in a ſmall Wound, that it makes for that Purpoſe in the Skin. Theſe Eggs hatch in Time, and the Part ſwells with the Hurt. A Cow ſhall thus be covered with filthy Boils, while its Blood is in a perfect good State, and this Accident the only Cauſe of it. There is a Maggot in every one of theſe Boils, which feeds upon the Matter bred there till it is of full Growth, and then crawls out and takes its Chance for appearing in the Fly State, as we have ſhewn of the other.

There is no Need to ſuffer the Creature to be tormented in that Manner till the Maggot goes out of itſelf; but the Aſſiſtance of a careful Hand ſhould be given to clear her of them at once.

Every one of theſe Boils or Lumps ſhould be opened

opened with a ſharp Knife; and the Maggot taken out and deſtroyed. The Wound is then to be dreſſed once or twice with the Ointment before directed, and the Creature will be perfectly freed from the Torment.

CHAP. XIV.

For Diſorders of the Lungs.

THESE are of various Kinds in the Cow and Ox Kinds, as in ourſelves, but Experience ſhews that one Remedy will ſerve for them all. Sometimes the Creature breathes with Difficulty, ſometimes coughs and wheezes; and in either Caſe, or any other proceeding from the Lungs, give the following Medicine. Bruiſe four Heads of Garlick, and preſs out the Juice, mix this with a Quart of new Milk, and add a quarter of a Pint of Tar. This will ſerve for four Doſes. One is to be given every Morning till the Cure is compleated. About four Doſes uſually anſwer the Purpoſe, but if more is required, the ſame Quantity is to be mixed up over again. The Tar does not mingle well with the reſt, but theſe are not very nice Creatures, ſo it goes down.

If the Diſorder be obſtinate, and do not readily give Way to the Remedies, the Creature ſhould be blooded, and they will then take Effect.

CHAP. XV.

For Foulneſſes of the Skin.

CATTLE of this Species are cleanlier in their Hides than moſt others, but they are not altogether free from Blotches, Scurf, and Scales.

When theſe appear they muſt inſtantly be taken Care of, for the Beaſt can never thrive that has them.

Firſt of all let the Cauſe be conſidered, which is often only want of Cleanlineſs, ſometimes a Diſorder in the Blood; and in ſome Caſes it is owing to both together.

Foulneſs of Diet is the common Cauſe of this Diſorder in the Blood; and this is uſually occaſioned by that Sort of rank Graſs which grows in wet Places, and the Weeds among it.

Therefore to undertake the Cure rationally let the firſt Thing be a Change of Paſture. From a low Ground full of rank Weeds, and abounding with Mud, remove the Cattle to a high dry Piece of Paſture, where the Graſs is very ſweet, and the Soil gravelly or otherwiſe dry, ſo that there can be no Dirt for them.

If the Diſorder be only owing to Uncleanlineſs, this Change alone will cure the Cattle.

If the Blood be concerned, this is alſo a very proper Method of aſſiſting the Effect of Medicines.

Let the Creatures be blooded: about a Pint and half from the Ox, and half that Quantity from the Cow.

Then let them be taken in and perfectly cleaned. Warm Soap Suds, a ſoft Bruſh and Flannels are the proper Remedies for this Foulneſs, or they are the needful Preparations for others.

When the Cattle have been perfectly cleaned, if any Scales remain let them be picked off; and the next Day let the Waſhing be repeated. This, and the Cleanneſs of the Paſture, will fully anſwer this firſt Purpoſe.

The next Day let the Creature be waſhed well over with the Lime Water, directed to be made in a former Chapter; and if any of the Scabs have grown to a Bigneſs ſince they were pick'd off, they muſt be rub'd again, that the Lime Water may get to the Root of the Diſorder.

Let this be repeated three Times, at two Days Diſtance; and all the while let there be ſome Flower of Brimſtone ſprinkled among the Hay that is given them in a Morning. In this Manner their Blood will be ſweetened, at the ſame Time that the outward Remedies perfectly cure the Diſorder.

CHAP. XVI.

Of falling of the Palate.

THIS is a Diſorder that frequently ſeizes upon Cattle after hard Labour and Colds, and is of a very troubleſome Nature, if not provided againſt in Time.

When the Palate is firſt fallen it is not difficult to replace, and keep it up; but when it has been any Time down the Difficulty of putting it up, and the Readineſs to fall again, are very great. I have known an Ox obliged to be killed when it was not intended, nor was he fit, becauſe he would otherwiſe have been ſtarved by the unconquerable Continuance and Relapſes into this Diſorder.

The Farmer will perceive that the Creature has this Diſorder by his great Uneaſineſs, and a particular Kind of hollow Groaning: he will be continually ſtriving to eat, but not able to ſwallow, and thus without Care he would go on till entirely ſtarved.

The Remedy is this; caſt the Creature, and getting the Hand into his Mouth replace the Palate as it ſhould be: then rub over it ſome Honey and Pepper mixed together, and let him riſe again: half an Hour afterwards bleed him a Pint and half or more; and thus the Complaint is commonly to be cured without any Danger of a Relapſe.

He muſt not be fed with Hay, but for ſome Days only with freſh ſweet Graſs.

CHAP. XVII.

Of Hurts in the Feet.

WHEN a Cow or Ox is obſerved to limp, and keep one or more of his Feet from the Ground as much as he can, the Occaſion uſually is ſome Complaint about the Hoof, and nothing ſo common as a Soreneſs between the Cloves.

For this the Remedy is eaſy.

Caſt him, and clean the Space between the Cloves perfectly well, rubbing it till it bleeds. In the ſame Manner clean all about the Foot.

Then chop a Quantity of the Leaves and Tops of Mugwort, boil them ſoft in Milk and Water, and put ſome in between the Cloves, and ſome about the whole Hoof, tie it on and let the Creature be kept quiet: the Cure is generally compleated at one Dreſſing.

Some accidental Foulneſs is oftener the Cauſe of this Complaint than any thing elſe; ſo that cleaning it, and laying on a ſoft healing Cataplaſm in this Manner, is a very natural Remedy.

When the Caſe is worſe, and there are actual Sores between the Hoofs, the beſt Method is to clean them as already directed, and then to dreſs them with a Quantity of Black Baſilicon ſpread all over ſome Tow, and drawn in between the Cloves. This ſhould be repeated every Day till the Cure is perfected.

CHAP. XVIII.

Of the panting Evil.

THIS is a Diſorder that ſhews itſelf in the Creature's Faintneſs and Unwillingneſs to ſtir; in his frequent panting, and as it were ſighing. It renders the Creature weak, and he generally waſtes in Fleſh.

The Remedy is this.

Boil a Quart of Ale and diſſolve in it half an Ounce of Mithridate, and a Scruple of Powder of Saffron.

Give this warm every Morning for four Times; it very rarely fails to make a Cure. The Creature muſt be fed upon dry ſweet Hay, and have his Drink warm during the Cure.

CHAP. XIX.

Of the Yellows.

THIS Diſorder in Cattle is of the ſame Nature with the Jaundice in ourſelves. It is perceived firſt by a Yellowneſs in the Eyes; and in the Lips; and the Creature is always lazy and weak. The Cure is this.

Bruiſe in a Marble Mortar a Baſketful of great Calendine Roots, Leaves and Stalks together: add to this a good Handful of Rue, and then ſqueeze out the Juice.

Mix with this an equal Quantity of Juice of Wood Lice, and give the Beaſt a Gill and half of it every Morning, for about a Week; and afterwards every other Morning for a Week longer. In this Time the Cure is generally compleated, and there is no Danger of a Return of the Complaint.

CHAP. XX.

Of the Gargil.

THIS is a very terrible Diſeaſe, and more difficult of Cure than moſt others.

It is an external Swelling and Inflammation; but the Blood is always concerned; and the Diſorder for that Reaſon ſpreads and defies all outward Remedies.

It appears at firſt in the lower Part of the Dewlap, in Form of a hard inflamed Lump, which ſpreads till it occupies the whole Dewlap, and reaches to the Throat, in which Caſe it is very often fatal.

This is the Diſorder called the Gargil diſtinctly and properly conſidered. It affects the Dewlap and Throat only; and it is the firſt Step toward the moſt dangerous Diſorders; but it is of a diſtinct Nature in itſelf, too often deſtroying the Cattle without encreaſing to any greater Degree of Malignancy than this.

Farmers confound the Terms of Diſeaſes, and Farriers more.

Authors who ſhould write for their Information copy their Miſtakes, and conſequently tell them only what they knew before, confirming them in Error, not leading to Truth.

We are entering now upon a Point of vaſt Importance; and unleſs the firſt Steps be cleared of Perplexity and Confuſion, the reſt will never be underſtood.

The Gargil and Garget are treated by theſe Writers, as well as ſpoken of by Farmers and others, as the ſame Diſorder, but this is the Diſtinction.

The Gargil is a Swelling in the Dewlap and Throat, extending no farther; the Garget is a Swelling of the Head and Eyes, with other external Parts, with Inflammation; and the Murrain is the ſame Swelling and Inflammation, extending itſelf alſo to the Inſide of the Throat, the Stomach, and the Bowels.

This laſt is the Diſtemper now, and of many late Years ſo fatal among the horned Cattle, it becomes the Farmer to underſtand it in all its Progreſs; and if the Phyſicians who have written ſo much about it had deſcended from the Cloſet to the Cow-houſe, they would have found the ſame Facts; and knowing ſomething of the Cauſe, they would have been more likely to have made a proper Judgment as to the Method of Cure.

The State of the three Diſtempers is this. The Gargil can never change to the Garget; and if ever it ſeems to do ſo, it is that the Farmer has obſerved the Throat more than the Head and Eyes, when they have been alſo affected, and the Diſorder has been the Garget all the Time, while he took it for the Gargil.

The Gargil may very naturally, and very frequently does change into the Murrain; but the Murrain may begin of itſelf without it.

That is, a Swelling of the outer Parts of the Head and Neck, which is the Garget, may ſpread inwards, and ſo be converted into a Murrain; or the Inflammation and Swelling may begin in the inner Parts, and then it is moſt dan-

dangerous, becauſe leaſt ſeen; and is moſt infectious becauſe the Breath conveys it to all thoſe which have their Heads near: this is the Murrain appearing in its proper Form; and this is of all the moſt fatal.

The Reader will thus underſtand the ſeveral Stages of the Diſorder among the horned Cattle, and thus perceive what is beſt to be done for preventing the Infection.

Having thus, from the firſt Origin, traced its ſeveral Degrees and Appearances, we ſhall now deliver the Method of Cure for this, which is but a Reſemblance, not an abſolute Degree of it.

As ſoon as the Gargil is perceived let the following Ointment be prepared. Melt together equal Parts of Pitch and Turpentine, and add a ſmall Quantity of Bees Wax. Let this be in Readineſs.

Slit open the Dewlap for three Inches in Length where the Swelling is, and let it bleed freely.

Bruiſe in a Marble Mortar a Handful of the Leaves of the great black Hellebore, and add to them ſome Hog's Lard: beat the whole up, and thruſt in a good Quantity into the Slit. Sow up the Wound to keep in the Ointment, and keep the Creature clean, warm and quiet for two Days.

Then open the Stitches, take out the Remains of the Hellebore, and melt ſome of the Ointment juſt directed to be made: dip a large Pledget of Tow in this, and put it into the Wound hot. Repeat this Dreſſing every Day till the Wound heals.

This generally proves a Remedy for the Gargil, when it is not of a very violent Kind; and when it is, ſcarce any Thing will be found effectual. The Addition of equal Parts of Gum Elemi and a few Grains of Euphorbium to the Ointment, is the beſt that can be done.

Let the Farmer firſt take Care that he diſtinguiſhes that it is really the Gargil, and nothing more that ails the Beaſt; and then he will need to do no more than this.

CHAP. XXI.

Of the Garget.

THE Garget commonly confounded with the former in Name, as the Words much reſemble one another, is in Effect a quite different Diſeaſe. It is as we have obſerved in itſelf very terrible; and it is the firſt Stage often of that dreadful Diſeaſe, under which our Cattle now ſuffer.

The Garget is a Diſorder of the outward Parts of the Head, which is attended with Swelling and Inflammation; which frequently ſpreads into the Mouth, and ſometimes into the Throat and down to the Inteſtines. In this laſt Caſe it is properly the Murrain, though it begun with the Garget.

It is very eſſential to treat of theſe diſtinctly, for the Remedies are different; and the proper Diſtinction is this: the *Garget* is *the ſwelling of the Head, Eyes and Lips, extending itſelf to the Gums and Tongue, but no farther*: when it goes farther it acquires another Name.

The moſt uſual Cauſe of the Garget is *bad Water*; but the extreme Degree of it and of the Murrain often ariſe from an infectious State of the Air; and it would be vain to ſeek their Origin elſewhere.

When the Farmer ſees an Ox or Cow affected in this Manner, with a Swelling in the Head diſcovering itſelf about the Eyes, the firſt Thing he is to do is to examine the Lips; and if they are ſwelled, he muſt look into the Mouth and examine the Tongue.

He muſt be careful in his Obſervations, becauſe upon the Difference in this Reſpect depends the Method of Cure which is peculiar in each Degree of this terrible Diſtemper.

If the Eyes, Lips, and whole Outſide of the Head be affected, and nothing more, the Remedy is to be as follows.

Firſt let the Creature be blooded very largely; and immediately after give the following Mixture.

Heat a Quart of Ale, and diſſolve in it three quarters of an Ounce of Mithridate; add ten Grains of Saffron, and a Tea Spoonful of ſweet Spirit of Nitre: give this every ſix Hours, and obſerve whether the Swelling about the Eyes decreaſe; for this is the great Symptom by which to know whether the Medicine takes Effect. Give the Drink warm, and as much as the Creature pleaſes.

If the Swelling continues, eſpecially if it encreaſes, bleed again more largely than before; and inſtead of the Medicine before directed, give three Ounces of Glauber's Salt diſſolved in Water.

This will purge the Creature pretty briſkly; and by this Change of the Remedies there is a fair Chance for a Cure: but we don't pretend to promiſe that Certainty of Succeſs in theſe as in many of the preceding Caſes.

The Diſtemper is of a very deſperate Kind; and there is always Danger. If theſe Methods both fail, the only proper Courſe is to continue them interchangeably, till there is an Amendment or Death. But we have ſeen it in many Inſtances, that the firſt Doſes have been ſucceſsful.

The next Stage in which we are to conſider this Diſeaſe, is that in which the Inſide of the Lips and the Tongue are affected.

This is ſtill the Diſorder diſtinctively called the Garget, provided that the Outſide of the Head be affected alſo; but if otherwiſe it is properly the Murrain, though in a leſs Degree than is uſually underſtood by that Name.

This we have obſerved in various Inſtances: we have ſeen a Murrain, that at firſt appeared leſs terrible than a Garget; but it does not long continue in that Condition: it grows worſe preſently. The Appearance of the Murrain in the Mouth alone is only its firſt Stage, according to the peculiar Manner of taking the Infection.

The Farmer is to conſider and examine this Diſtinction carefully; for thoſe Medicines will be proper in one Caſe, that will be trifling in the other.

Thus then, if he firſt perceive the Outſide of the

the Head ſwell, let him examine within the Mouth, to know whether it have alſo ſpread ſo far: and on the other Hand, if he firſt perceive the Diſorder in the Mouth, let him next examine the Head on the Outſide, to diſtinguiſh whether it be the Garget, or the firſt Stage of the Murrain. We are to ſuppoſe it the firſt of theſe Caſes; and that he finds the Eyes ſtarting, enflamed and ſwelled; the Lips hot and ſwelled; and perhaps the under Part of the Neck, for ſometimes that joins: and he will alſo perceive the Tongue to be very much diſordered. This in the preſent Caſe is a very eſſential Point; for the Tongue is uſually the principal Seat of the Diſtemper.

Let the upper and under Side of the Tongue be ſearched carefully, and probably there will be found one or more Bliſters on the Top or Sides; or a Lodgment of Matter under it; ſometimes both.

Theſe Bliſters muſt be cut, and the Point of a Lancet or fine Knife muſt be thruſt into the ſore or ſwelled Part underneath.

This done, the whole Tongue is to be waſhed ſeveral Times with ſharp Vinegar mixed with Salt, and rubbed with a clean Cloth: by this Means the foul and offenſive Matter will be let out. Then the Creature muſt be kept to the following Courſe of Medicines.

Firſt let him be largely blooded.

Then mix together a Pint of Ale, three quarters of an Ounce of Venice Treacle, a quarter of an Ounce of Anniſeeds in Powder, and two Spoonfuls of the Juice of Rue: this is all to be heated and given at a Doſe; and it muſt be repeated Morning, Noon and Night. Let the Creature be kept warm, and let his Drink be Water, that has been poured hot upon a good Quantity of the Herb Agrimony, and let him have it warm.

I have ſeen thoſe who were impatient with this Courſe, give a Purge in a Day or two, but I never knew it ſucceed. Many have died while it was operating: and on the other Hand ſeveral have recovered by a careful Perſeverance in this Courſe, which have at firſt ſeemed to afford very little Proſpect of it.

CHAP. XXII.

Of the Murrain.

THE Murrain is the higheſt Degree of theſe Diſtempers, and the worſt that can fall upon the Cattle of this Species. What we call the Diſtemper among the horned Cattle at this Time, is the Murrain diſtinctly and properly ſo named. It is an Inflammation of the whole Paſſage through the Body from the Mouth to the fartheſt Extremity of the Guts; and it is attended with a very bad State of the Blood. It ſometimes ariſes from very unfavourable Weather; the drinking bad Water, and being reduced to feed upon rank coarſe Graſs: but the general Origin of it is in the Air, which there is no accounting for. Some Cattle are, by the State of their Blood and Humours at that Time, more expoſed to receive the peſtilential Vapours than others; but all are expoſed to it: and when it has once taken Place, it ſpreads by abſolute and plain Contagion.

This is the Cauſe of its being terribly deſtructive in ſome Counties, and ſcarce appearing at all in others: and to this it is owing, that wherever it gets Footing it ſpreads and continues.

There is no Wonder that Creatures ſtanding near one another receive the Contagion with the Breath, which is ſent out in the Reſpiration from the others; eſpecially as the Temperature of the Air favours the ſpreading.

Upon this Principle we ſee the Wiſdom of the Legiſlature, in forbidding Cattle from infected Places to be brought into Counties where the Diſeaſe is not: and this gives the Farmer the firſt Hint of his proper Conduct.

As ſoon as he perceives this terrible Diſorder upon any one of his Cattle, let him ſeparate that from the reſt, and take Care of all.

The firſt Step is to bleed largely; and this ſhould be extended to the ſick and the well. In Reſpect to the ſick, it is the proper Step to abate the Inflammation; and as to the reſt it may be ſufficient to prevent the breaking out of the Diſeaſe upon ſuch as would otherwiſe have had it, from ſome ſlight Degree of Infection communicated before the Separation of the ſick: or if it do break out upon them, they will have it more favourably.

In another Senſe alſo it is very proper: we ſee that the Air is at theſe Times full of the peſtilential Matter, and that ſome Cattle do and others do not receive it. Thoſe whoſe Blood is in the greateſt State of Inflammation, are naturally moſt liable to it; and the Bleeding is a Way of taking off that Condition of the Maſs.

The Cattle that are ſeparated by Way of Preſervation need no farther Care after bleeding; unleſs the Diſeaſe appear upon any of them. In that Caſe ſuch as are taken with it muſt be ſeparated from the reſt; and this is the Manner of treating them.

As ſoon as they have been blooded, let a Quantity of Vinegar be made hot, and a little Salt diſſolved in it; and with that let their Tongues, Mouths, Lips, and Teeth be thoroughly waſhed.

Beat in a Marble Mortar Half a Dozen large Heads of Garlick: preſs out the Juice, and add to it an equal Quantity of Tincture of Myrrh. Set on Half a Pint of Ale to be hot, and put to it a quarter of Pint of this Mixture. When it is all hot together pour in two Spoonfuls of Tar, and then immediately give it to the Creature.

The Tar will not mix with the reſt, but it will go down with them.

Let this be repeated once in four Hours; and if there be no Amendment the firſt Day, let the Creature be blooded again the Day following, and the ſame Courſe continued.

I have ſeen many other Medicines tried, indeed almoſt innumerable; for of all Herbs and Drugs that the old Woman and the Doctor have ever recommended in peſtilential Diſtempers, not one has been omitted on this Occaſion. The Diſeaſe is in itſelf ſo terrible, that it would be Falſhood and Folly to boaſt of vaſt Succeſs

from any: but this we can aſſure the Farmer, whoſe Condition we moſt ſincerely pity when under this Viſitation; that of all the Medicines that have come to our Knowledge this has ſucceeded beſt. Many have been abſolutely recovered by it, when all who ſaw them ſhook their Heads, and ſuppoſed them loſt.

Beſide the great Value of this as a Remedy for the Diſeaſe when it is come on, there is nothing ſo good as a Preſervative againſt it.

For this Reaſon, when ſome Cattle of the Farmers are taken ill, and are ſeparated from the reſt; and when, one after another, ſeveral of thoſe ſet apart fall into it, the whole Number of them ſhould be preſerved if poſſible from the ſame Fate, by taking largely of this Medicine.

The Farmer will not grudge his Trouble when he ſees the Benefit that may ariſe, and when he conſiders the Danger from which he is defending them.

They ſhould all have a Doſe Night and Morning for ten Days after their Separation from the ſick.

BOOK XIII. SECT. III.

Of the Diſeaſes of SHEEP.

CHAP.
1. *Of a Fever.*
2. *Of a Purging.*
3. *Of the Tag.*
4. *Of Diſorders of the Lungs.*
5. *Of the Jaundice.*
6. *Of Stoppages in the Throat.*
7. *Of Sturdyneſs.*
8. *Of the Wood Evil.*

CHAP.
9. *Of the Staggers.*
10. *Of the Scab.*
11. *Of the Red-Water.*
12. *Of the Foot-Worm.*
13. *Of the Wild-Fire.*
14. *Of Diſorders of the Eyes.*
15. *Of the Dropſy.*
16. *Of the Rot.*

The INTRODUCTION.

THESE tho' not ſo numerous as the Diſorders to which the larger Cattle, before treated of, are liable, yet are ſuch as it imports the Farmer as well to underſtand; for they are as fatal as thoſe of the other Cattle, and ſome of them as difficult of Cure, though the greater Part are eaſy. We ſhall explain them ſeverally, according to their Nature; and having eſtabliſhed their Diſtinction according to the Cauſe and Symptoms, ſhall lay down for the Cure ſuch Methods as have been found ſucceſsful, upon repeated Experience, within our own Knowledge.

CHAP. I.

Of the Fever.

THE Farmers know very well what they mean by the Fever in their Cattle, and the Name is not without juſt Reaſon. The Fever in Sheep is an inflamed State of the Blood, diſordering the Eyes and Mouth, ſo that it is eaſily ſeen, and affecting the whole Body of the Creature, though not ſo viſibly.

When theſe Signs of a feveriſh Diſpoſition appear in Sheep, the Farmer muſt feel their Feet; if they are hot, he may be ſure he has gueſs'd right as to the Nature of the Diſtemper; and this is a needful Caution, becauſe there are other Diſorders that will give an inflamed Look to the Eyes and Mouth.

The Diſeaſe is often deſtructive in itſelf; and frequently it brings on other fatal Diſorders.

The Cauſe is generally Cold. When only two or three are affected by it, the Caſe is leſs deſperate; but when many together, it is always the more fatal.

The firſt Thing to be done is to remove the Cauſe; that is, to keep the Sheep in a warmer and more ſheltered Place.

In the Heat of Summer the weaker among the Flock will be ſometimes rendered feveriſh, only by being expoſed too much to it; and in this Caſe the firſt Method is juſt contrary to the former: he muſt drive them to ſhelter: in either Condition they muſt be kept quiet, and muſt have wholſome ſweet Graſs and freſh Water. Then the following Remedies will take place;

Firſt bleed the Sheep that are affected with the Diſorder, and afterwards give to each the following Medicine with a Horn.

Heat a Quart of Ale, and diſſolve in it an Ounce of Mithridate, add half an Ounce of Virginian Snake-Root, and one Dram of Cochineal in Powder. This Quantity ſerves for four Doſes, and one of them is to be given Night and Morning.

If the Sheep be bound in its Body, an Ounce of Lenitive Electuary is to be mixed with each Doſe; but if looſer than ordinary, that is not to be regarded during the Courſe of the Remedies, for it will contribute to the Cure. The four Doſes uſually are ſufficient.

CHAP. II.

For a Purging.

WE have directed the Farmer to leave Nature to her Courſe when a Purging comes on, with a Fever, in Sheep; but when the Fever is abated, the Purging muſt be ſtopp'd; and the ſame Remedy that anſwers for this Purpoſe, may be given in the ſame Manner for ſuch Purgings as come on of themſelves.

Boil a quarter of a Pound of Raſpings of Logwood in two Quarts of Water, till but a Quart is left; when it is near done, put in a Stick of Cinnamon. When it is done, ſtrain it off, and give the Sheep a quarter of a Pint of it, with a Horn, four Times a Day, till the Purging ceaſes.

This ſeldom fails to take Effect very kindly upon that Kind of Purging which was a Symptom of a Fever, though it remains after it is over; but if on other Occaſions it does not ſtay the Diſorder, the following Addition will render it ſure of Succeſs.

To every Doſe of this add a quarter of an Ounce of Diaſcordium without Honey, and ten Grains of Japan Earth powdered; give the Doſes only Morning and Night when they are thus increas'd in Strength.

CHAP. III.

Of the Tag.

THIS though an external Diſorder, yet naturally comes in here, becauſe owing to the Complaint laſt named.

It is a Diſorder of the Tail beginning with Filth and Foulneſs, and ending in Ulceration and very bad Conſequences.

The Tag is ſituated in the inner Part of the Tail: it conſiſts of Scabs and Sores, very painful and waſting to the Creature; and it is owing to the fouling of this Part by a Purging.

That Tag is always worſt which follows a Fever, becauſe the inflamed State of the Blood tends to encreaſe the Diſorder; and when it begins, during the Continuance of the Diſeaſe, the Matter of the Fever may chance to ſettle there. In either Caſe two Things are to be done; the firſt is, to ſtop the Purging, that the Stools may fall as uſual; and the other, to clean the Tail.

The laſt mentioned Remedy, either in its weaker or ſtronger Form, is to be uſed to ſtop the Purging; and the Tail being clipp'd, and the ſore Part laid bare, firſt waſh it carefully with Milk and Water Blood-warm, and then with Lime-water. After this turn the Sheep looſe into a clean dry Paſture.

Two Days after look at it again, and, if not well, repeat the Waſhing, and anoint it with Greaſe and Tar mixed together. Twice doing of this is generally ſufficient for the compleating of a Cure.

CHAP. IV.

Of the Diſorders of the Lungs.

SHEEP are very ſubject to be diſordered in the Lungs, which is eaſily perceived in their Breathing or by their Coughing: nothing requires a more ſpeedy Remedy; for they grow incurable when it is neglected but a little Time; and die as Men in a Conſumption.

Change of Air and Paſture are eſſential to the Cure of this Diſeaſe; without this Caution no Remedies will take Place: with it the following rarely fails.

The Cauſe of this Diſorder, in whatever Form it appears, whether in coughing, wheezing, or panting, in Difficulty or Shortneſs of Breath, is the ſame. It is owing to Cold; and it generally comes upon Sheep that have been kept in low Grounds in wet Weather.

Firſt drive them into an encloſed Paſture where there is ſhort Graſs and a gravelly Soil; and, if poſſible, where there is ſpring or other running Water.

Bruiſe a Baſket-full of the Leaves of Colt's-foot, and preſs out the Juice.

Bruiſe in the ſame Manner an equal Quantity of Plantain, Leaves and Roots together, and preſs out its Juice. Mix theſe, and bruiſe as much Garlick as will yield about a fourth Part as much Juice as one of the others. Mix all together, and add to them a Pound of Honey, an Ounce of powdered Aniſeeeds, and an Ounce and half of powdered Elecampane; give a quarter of a Pint of this, warm, to every Sheep that is affected, once in a Day, and it will by Degrees make a perfect Cure.

Out of a whole Flock thus affected, when the Farmer has taken thorough Care in this Reſpect, I have known when not one Sheep has been loſt. I write this from Experience.

CHAP. V.

Of the Jaundice.

SHEEP are more ſubject than any Animal whatſoever to Obſtructions of the Liver; and this is generally ſeen in a Yellowneſs of the Eyes, and a Tinct of the ſame Kind in the Skin, when carefully examined. Our Farmers, in ſome Places, call this the Choler; or, as they ſpeak it, the Colour: it is properly a Jaundice.

Drive the Sheep that are affected with this Diſorder into an open Paſture; and let the Shepherd or Perſon who has the Care of them, have Orders to keep them often in Motion, but not to fatigue them; then prepare the following Remedy.

Boil in four Gallons of Water two Pound of Fennel Roots, the ſame Quantity of Parſley Roots, and twice that Quantity of Roots of Dog-Graſs, or Couch-Graſs, all cut ſmall; when the Water is very ſtrong of them, and there is about half the Quantity left, ſtrain it off, preſſing it hard.

Bruiſe

Bruiſe in a Mortar as much Great Celandine as will yield three Pints of Juice, add this to the Liquor, and laſtly put in three Drams of Salt of Steel.

Mix all well together, and every Day heat ſo much of it as will ſerve to give every one of the Sheep that is ill a Gill and half for a Doſe. This, with the forementioned Directions of good Paſture and Water, and moderate Exerciſe, rarely fails of a Cure.

CHAP. VI.

Of Stoppages in the Throat.

WE have treated of Diſorders of the Lungs, and ſhewn the Remedy; but the Farmer will yet find another Diſorder imitating the Appearance and Symptoms of theſe, which is only in the Throat. The Sheep affected with this, wheaze and breathe with Difficulty. It commonly ariſes from bad Paſturage and Colds. The Remedy is this: Drive them into a higher Ground and keep them warm; then give the following Medicine.

Bruiſe a good Quantity of Penny-royal, and ſqueeze out the Juice. Put to a Quart of this a Pound of Honey, and half a Pint of ſharp Vinegar.

Give the Sheep half a Pint of this, Blood-warm, every Night.

Penny-royal is, by ſome, delivered as a general Remedy for all Diſorders of Sheep; but this is very erroneous: nothing has been hitherto ſo little underſtood as the Medicines proper for Cattle. What are here delivered, are, in general, ſupported by Experience; and that Phyſician who has Judgment to propoſe more Remedies, and Patience to ſee them try'd fairly; to approve and eſtabliſh the beſt, alter and amend the others, and finally to publiſh the Reſult of all, will deſerve a Statue, for the Good done to his Country, more than all her Heroes.

CHAP. VII.

Of Sturdyneſs.

THE Diſorder Farmers call by this Name, is a Kind of Vertigo or Giddineſs in the Head in Sheep. It riſes principally from very rich Feeding, and is often fatal. The Cure is this.

Bleed the Sheep largely, then give the following Draught. Bruiſe ſome Roots of wild Valerian, ſqueeze out the Juice, heat it, and give a quarter of a Pint. Repeat this once in four Hours.

When the Sheep is recovered, turn it upon the Common, or into ſome barren hilly Paſture; it will be kept from Relapſes by having but little Food, and that perfectly wholſome. When this Diſeaſe returns it is commonly fatal.

CHAP. VIII.

Of the Wood Evil.

THE Diſorder Farmers underſtand by this Name is a kind of Cramp: it ſeizes the Legs of Sheep, and will often affect a whole Flock at once.

The Cauſe is cold and wet. The lying under the Drip of Trees in Rainy Seaſons has often occaſioned it, and thence it got the Name of the Wood Evil.

The firſt Care is to remove the Sheep into a dry Paſture, and then the Cauſe being removed, proper Remedies may take Effect upon the Diſeaſe, which would otherwiſe be incurable.

Boil in a large Quantity of Ale as much common Cinquefoil and Hedge Muſtard as can well be ſtir'd into it. When the Liquor is very ſtrong, ſtrain it off, and add a Pint of Juice of Valerian Root to every Gallon of the Decoction.

Give the Sheep that are affected with the Illneſs half a Pint of this, in a Horn, Morning and Night.

Boil in Vinegar a large Quantity of the Leaves of Hedge-Muſtard, and with this Liquor, hot, rub the Legs of the Sheep.

The Trouble of this Method muſt not diſhearten the Farmer from obſerving it punctually, for the whole Flock may be loſt if it be neglected; and when they are once relieved, and in a warmer Paſture, they ſeldom relapſe.

CHAP. IX.

Of the Staggers.

SHEEP have this Diſorder as well as Horſes, and it ariſes from improper Food. They are apt to crop the young Shoots of Trees when in their Reach; and though many of theſe are wholſome, ſome are hurtful. It is found by Experience, that the eating the Oak Leaves and Buds is particularly prejudicial; it binds them in the Bowels, and frequently the Staggers follow.

The Symptoms are much like thoſe of the Sturdyneſs, deſcribed before, but more violent; and there is generally a Trembling, at the ſame Time, of all the Limbs. The Remedy is this.

Diſſolve an Ounce of Aſſafœtida in two Quarts of Water. Give the Sheep a quarter of a Pint of this, warm, every three Hours; it commonly opens their Bowels at the ſame Time that it takes immediate Effect upon the nervous Diſorder, and thus performs a perfect Cure. Some of our Farmers put the Aſſafœtida into the Ears of the Sheep; but that is a very idle Practice. The Medicines are eaſily given them inwardly with a Horn, and there is no other Way in which any Dependance can be placed upon them.

When the Sheep are thus recovered, let them be kept out of the Way of a Return to the ſame Food, and they will be in no Danger of a Relapſe.

The Farmer will ſee by the ſeveral Accounts of theſe moſt ordinary Diſeaſes incident to Sheep, that

that they are not ſo ſubject to them as many other Creatures, from a Variety of unknown Cauſes, but fall into them principally from a bad Method of keeping. In general, low Grounds are the moſt unwholſome; for they abound with wet, and they give Birth to many Weeds of a poiſonous Nature not found in others. And we ſee that Woods are diſadvantageous on many Accounts: therefore let him be careful of his Feeding, and he will have leſs to fear on Account of Diſorders in this Kind; and when they ſo happen, they will be lighter and more eaſily remedy'd.

CHAP. X.

Of the Scab.

THIS is a filthy Diſorder to which Sheep are very liable; but as many of the others, before deſcribed, ariſe oftener from ill Management than any natural Defect, ſo this more than any.

Sheep kept on Downs, or in dry wholſome Paſtures, are very little liable to it; thoſe which lie wet, or get under Droppings of Trees in bad Seaſons, are frequently affected by it in the ſevereſt Manner.

When the Wet falls upon their Skins, and they are heated afterwards; but eſpecially when they lie under Trees and the Wet falls upon them from the Branches, their Skins ſoon after grow ſcurfy, and in a little Time from that there riſe Scabs in various Parts of them; upon this the Wool grows looſe, and the Sheep pine and become lean.

If it be a Seaſon for Shearing, or that can be done with any Degree of Propriety, nothing is ſo good a Step to the Cure: if not, the ſame Remedies muſt be applied without: Cleanlineſs is the great Article for keeping them well; and it is vain to begin a Cure without it.

They muſt be waſhed every where in the foul Places with Soap-ſuds, made very ſtrong, and uſed warm with a Flannel or Bruſh.

After this they muſt be turned looſe in a clean Paſture, and muſt be driven up again as ſoon as well dry'd, and all the ſore Parts muſt be well wetted with Lime-Water.

In both theſe Applications, the ſcurfy Parts of the Skin, as well as the ſcabby Places, muſt be regarded; and probably the doing this three Times, at two Days diſtance each, will be a Remedy.

If this fail, the Parts that have been thus waſhed and cleaned, muſt be anointed with a Mixture of equal Parts of Tar and Greaſe, and they will ſoon be perfectly well. No inward Medicines are required in this Caſe, for the Complaint is only on the Skin.

CHAP. XI.

Of the Red-Water.

FARMERS do not ſeem well to underſtand themſelves in reſpect of this Diſorder; but in ſome Places call an inward Diſeaſe, and in others an outward one, by this Name. The laſt is the proper Meaning of the Word, and it is a very dangerous Diſorder. Though it appears outwardly it is not entirely of the external Kind, as the former; but the Blood is always more or leſs affected with it, and conſequently Care muſt be taken accordingly, by inward as well as outward Medicines, in the Cure.

The great Miſtake has been the attempting it by outward Remedies alone, and this is the Cauſe why it has been found ſo difficult of Cure.

The Appearance of the Diſorder is about the Breaſt and Belly principally, but it will ſpread itſelf to other Parts. It is an Inflammation of the Skin that often raiſes it into Bliſters, and in thoſe is contained a ſharp Humour, thin, watery, and coloured with Blood. This is the Occaſion of the Name, and this the Diſorder properly called by it.

Nothing muſt be done to ſtrike it in, but the Cure regularly attempted by amending the bad State of the Blood.

Firſt, the Sheep that are affected with it, muſt be ſeparated, or otherwiſe it will be very apt to ſpread among them; and they muſt be put where there is ſweet Graſs and good Water, or the Medicines will take little Effect.

Mix half an Ounce of Flour of Brimſtone with an Ounce of Honey; work it well together, and then divide it into two Parts. Diſſolve one of theſe in half a Pint of Juice of Nettles, and give it every Day for a Fortnight. This Method obſerve with all that are diſordered.

Slit the Bliſters when they are full of this watery Humour, and having let the Matter out, wet the Place with Juice of Wormwood.

After four Days of this Courſe, bleed them pretty plentifully; and then continue the ſame Method till they are well.

CHAP. XII.

Of the Foot-worm.

SHEEP are liable to the breeding of Worms between their Feet; but this, like the other Accidents, is principally when they are kept in wet or damp Paſtures. It is very painful to them, and will make them pine away.

It is perceived by their frequently holding up one Foot; and by their ſetting it but tenderly down.

In this Caſe let the Foot be waſhed clean, particularly between the Toes, and there will be ſeen a little Lump like a Tuft of Hair. This is the Head of the Worm. It is to be taken out with Care, for 'tis of a tender Subſtance, and if it be broke in the Foot it will occaſion an Inflammation. The beſt Method is to open the Fleſh on each Side of it, and then, by Means of a Pair of Knippers, to take it very gently out.

Then dreſs the Wound with Tar and Greaſe melted together in equal Quantities, and turn the Sheep looſe.

It is better to put it into a freſh Paſture; for if the ſame Diſorder returns, it is generally worſe.

CHAP.

CHAP. XIII.

Of the Wild-Fire.

THIS is a very violent Inflammation, which appears in the Manner of a Saint Anthony's Fire, upon the Skin of the Sheep, in different Places; and when it is diſcovered on one generally infects more; often the whole Flock.

Our Fore-fathers were ſuperſtitious on this Occaſion, they bury'd the Sheep alive with its Feet upwards at the Door of the Fold; and ſuppoſed this acted as a Spell to drive away the Diſeaſe. We do not inherit theſe Errors. The Method to be obſerved is this.

Such Sheep as are infected with it, are to be ſeparated from the reſt: then bleed them, and prepare the following external Remedy. No other is required: and it is ſingular in this Diſorder, that although more violent than the Red-water, it does not at all infect the Blood, ſo that nothing inward need be given.

Bruiſe a good Quantity of the Leaves of wild Chervill, and add to them as much Lime-water as will make the Whole very ſoft. When it is thus beat up together and perfectly mix'd, add as much Powder of Fenugreek-ſeed as will reduce it to the Conſiſtence of Pap; then put it into a Pan, and ſet it in a cool Place. Rub the ſore or inflamed Part carefully with this every Evening, and make as much lie on as can be kept there; it will take Effect during the Time of Reſt, and is to be repeated as long as there is Occaſion.

CHAP. XIV.

Of Diſorders of the Eyes.

SHEEP are often affected with Colds falling upon their Eyes, and almoſt blinding them; and, at other Times, the ſame Accidents ariſe without any viſible Cauſe. The Remedy in either Caſe is the ſame.

Preſs out the Juice of Great Celandine, and drop a Quantity of it into the Eyes Night and Morning.

CHAP. XV.

Of the Dropſy.

SHEEP are often ſwelled with Water in their Bellies; and this, if not regarded in Time, is attended with certain Deſtruction. There are two Ways in which it is lodged; the one is between the outward Fleſh and the Rim; the other is within the Rim. In the firſt Caſe, the Cure is eaſy; in the other, nothing can be done.

The Method, in the firſt Caſe, is by a coarſe kind of Tapping.

An Opening is to be made in the Fleſh, and a Quill thruſt in; this will give the Water a free Paſſage out, and the Wound heals of itſelf, if if the Sheep be otherwiſe tolerably healthy: but when the Diſeaſe has been of long Continuance, and the Creature is emaciated by it, Nature will not have Strength to heal it: in that Caſe, the Sheep is to be examined daily, and the Wound dreſſed with Greaſe and Tar.

The Creature muſt be put into a freſh, dry, and wholſome Paſture, and then diſpoſed of as ſoon as recruited; for this is a Diſorder that never fails to return upon any Miſmanagement or Neglect in the Keeping.

CHAP. XVI.

Of the Rot.

THE Rot among Sheep is like the Murrain among larger Cattle, the moſt deſtructive of all the Diſorders to which they are liable, and the moſt to be dreaded by the Farmer. We have reſerved it for the laſt Conſideration, that what has been premiſed concerning the other Diſorders, may have led him ſo far into the Nature of Animals, as to make him perfectly comprehend all that relates to this.

This Diſorder is contagious, like the Murrain. Whenever it appears it uſually ſpreads thro' the whole Flock; and often over the whole neighbouring Country.

Preſervation from it is a Point of as much Importance as its Cure; indeed of more, becauſe the Cure is very uncertain.

The Cauſes of the Rot are various, but the principal is Careleſſneſs in the Owner. Sheep that feed at large upon open Commons, are much more ſubject to it than ſuch as have Shelter, and are taken due Care of at Nights: thoſe which feed in the dampeſt Grounds, are moſt ſubject to this, as to other Diſeaſes; and it frequently ariſes from a cold Seaſon and dribbling Rains coming on ſoon after the Shearing. Theſe taint the Skin, and bring on the Diſorder. Laſtly, want of Food will occaſion the ſame Diſeaſe; and the eating ſuch Graſs as is full of unwholeſome Plants. Theſe we ſhall particularize in a ſucceeding Chapter.

Such are the Cauſes of this terrible Diſorder in its original Appearance in many Places; but the Farmer, beſide theſe, is to obſerve that the worſt and moſt common is Infection.

Let him, at all Times, take Care to keep his Sheep out of the Way of theſe original Cauſes of the Rot; and he will find the ſame Care will preſerve them from moſt other Diſorders: and, beſide this, when the Diſtemper is any where near him, let him be careful to keep them clear and diſtant from all others.

Damp Grounds are always dangerous in this Reſpect; and in wet Seaſons eſpecially.

In theſe wet Times, the beſt Practice is quickly to remove the Flock to the upland Paſtures, and to give them ſome Hay as a Part of their Food.

The happieſt Thing that can chance to the Farmer in this Caſe, is to diſcover the Diſeaſe in Time. The firſt Notice of it will be perceived in the Eyes; and therefore in a wet Seaſon, and eſpecially at a Time when the Rot is

among the neighbouring Sheep, let him look into that Part. When a Sheep is infected with this Diſorder, the White of the Eyes looks dead and dull, and they have a weak faint Aſpect; the Creature is feeble, and his Skin is foul: the Wool is ſo looſe that it comes off in Handfuls with the leaſt Touch; and the Gums will look pale and the Teeth foul. He will be dull and liſtleſs in Motion; and heavy, as if his Legs were not able to carry him.

In this Caſe, the Diſeaſe is ſtrong upon the Creature. Many are generally infected at a Time, and the firſt Care muſt be to remove them from among the ſound ones: the diſtinction may be made by the Rules we have juſt laid down; and the ſick muſt be pent up in a cloſe Fold.

They muſt be allowed little Water; and their Food muſt be dry Hay and Oats. The beſt Way of giving theſe, is by Means of Troughs placed all round the Fold.

Bleeding, which is beneficial in moſt other Diſorders, is altogether deſtructive in the Rot. Some have try'd it; and what I write is in Conſequence of what I have ſeen as the Reſult of their Practice.

It has been obſerv'd univerſally, that Sheep fed in Salt Marſhes never have the Rot. This put it naturally into People's Thoughts to try Salt as a Cure; and we read Wonders of its Effects.

This alſo I have ſeen try'd, and ſometimes with good Conſequences; but never with the great Succeſs that is boaſted by many. Salt is a Preſervative againſt the Rot; and that is all we rationally learn from the Cattle not being infected with it, that feed in the Salt Marſhes; but it is not ſo certain a Cure.

The beſt kind of Salt for this Purpoſe, is Bay-ſalt; and the beſt Way of giving it, is by beating it to Powder, and then ſprinkling it among the dry Food. Though we do not adviſe the Farmer to rely upon it entirely, we ſhall recommend it, among other Remedies, in this Manner.

Bruiſe to Powder an Ounce of Grains of Paradiſe, and four Ounces of Juniper-berries dry'd; add to theſe two Pounds of Bay-ſalt and half a Pound of Loaf Sugar, grind them all well together, and ſprinkle ſome of this upon the Hay and the Oats that are given the Sheep.

Let this Courſe be continued three Days, and look from Time to Time into the Eyes of the Sheep, and examine every other Way, to ſee whether they mend or grow worſe. If there be Signs of Amendment, let the ſame Courſe be continued: if not, the following muſt be uſed. Steep four Pounds of Antimony in two Gallons of Ale, for a Week; then give the Sheep this every Night and Morning, a Quarter of a Pint at a Time.

Boil a Pound of the Roots of the common Avens, and two Pounds of the Root of Maſterwort, in two Gallons of Water, till there is not more than ſix Quarts remaining: ſtrain this off, and preſs it hard; then pour a Pint of it into a Pail-full of Water that is to be given to the Sheep.

By theſe Means, carefully managed, and under a good Regulation in the Articles of Cleanneſs, Dryneſs, and Warmth, the Rot will be often cured: this is all that can be promiſed upon the moſt ſanguine Expectations; for there are Times when the Diſeaſe is ſo rooted, and when the Temperature of the Air ſo favours it, that nothing will get the better of its Violence.

In the Courſe of this Method, if the Sheep have a Diſtaſte to their Food, becauſe of the Salt and other Ingredients mixed among it, they muſt be omitted for two or three Feedings; and then given in leſs Quantities: and if this take Effect the other need not be uſed; if otherwiſe, it will be beſt to take the Benefit of both together; the Salt and other Ingredients being ſprinkled among the Food, while the Drenches are given at the regular Times.

BOOK XIII. SECT. IV.

Of the Diſorders of HOGS.

CHAP.
1. *Of the Fever.*
2. *Of the Murrain.*
3. *Of the Jaundice.*
4. *Of Sickneſs at the Stomach.*
5. *Of the Meaſles.*
6. *Of the Lethargy.*

CHAP.
7. *Of the ſwelling of the Milt.*
8. *Of a Purging.*
9. *Of Impoſthumations and Boils.*
10. *Of Foulneſs of the Skin.*
11. *Of ſore Ears.*
12. *Of the Pox.*

The INTRODUCTION.

THE Hog is not without its Diſorders, tho' they are not ſo many as thoſe which attend the Sheep. We ſhall not leave the Farmer uninſtructed in any thing that concerns his Intereſt; wherefore we name them here, and ſhall deliver the Symptoms by which they are known, and the approved Remedies.

CHAP. I.

Of the Fever.

WE have ſhewn how common a Diſeaſe a Fever is among Cattle of moſt Kinds; and the Hog is not exempt from it. The firſt Symptom of

of it is his forſaking his Food. The Hog has a ravenous Appetite from Nature, and when the Farmer perceives this he may be ſure ſomething is much amiſs. He will ſoon after be perceived to droop and grow faint, and if not taken ſome Care of will pine in his Fleſh, and the Diſorder will end in his Deſtruction.

The firſt Step towards a Cure is bleeding, and the beſt Place for performing this Operation is behind the Ears. If this Part do not bleed freely, his Tail is next to be cut; and between one and the other there will be got enough. A Pint is a proper Quantity to take away.

After the bleeding put him up warm, and give him a good hot Meſs made of Raſpings of Bread, Broth, and ſome chopped Penny-royal.

This is a Thing he is very fond of: the Bleeding will have given him ſome Relief; and he will take to it. As ſoon as he has well taſted it take it away.

This will make him ravenous, and he will ſwallow it with the Addition of a Medicine, which he would not have done before. This muſt be Philonium Romanum. Half an Ounce of it muſt be put into a Gallon of the Meſs, and he muſt eat a little at a Time. If he take above half he will have an over Doſe of the Medicine, therefore it muſt be taken away; and eight Hours he muſt be kept without any thing elſe. This will make him ready to take the Remainder; and that probably will make a perfect Cure.

It will be ſeen when he is well by his eating freely and heartily: and if he do not appear much recovered the next Day the Bleeding muſt be repeated, and the ſame Medicine given again.

CHAP. II.

Of the Murrain.

THIS is as fatal to Hogs, as to other Creatures of the Farmer's Stock.

It is owing to eating a vaſt deal of bad Food; and it diſcovers itſelf by the Waterineſs of the Eyes, and by the hanging of the Head to one Side: the Creature alſo is weak, faint, and refuſes its Victuals.

The Cure is this. Make a very good warm Maſh; and let them be kept all the Afternoon and all the Night faſting before it is ſet before them. Put into it half a Pound of grey Ground Liver-wort, and the Bigneſs of an Egg of Red Oaker, with as much Salt-petre as will lie upon a Shilling, powdered.

The Hog will generally be tempted to eat ſome of this after ſo much faſting.

When he leaves off, if he have ſwallowed ever ſo little, take it away.

Four or five Hours after ſet it before him again, and he will eat more; and by this Means he will be brought to his Stomach. All his Food muſt have a little Salt-petre and a good Quantity of Liver-wort in it. This will take Effect, if he be within the Reach of Remedy: but it is a Diſeaſe that is very often fatal. Cleanineſs and good Management muſt aſſiſt, or no Medicines will do.

CHAP. III.

Of the Jaundice.

THE Hog is ſubject to an overflowing of the Gall, which would diſcolour the Skin if it were leſs thick and coarſe; but it ſhews itſelf by a Yellowneſs of the Eyes and about the Lips, and by a Swelling that riſes under the Jaws. The Cure is this. Bruiſe a good Quantity of great Celandine, and preſs out the Juice; add to it one fourth Part the Quantity of Vinegar.

Bruiſe a good Quantity of Wood-Lice in a Mortar; and when all is ready make a hot Maſh into as much of this as the Hog will eat at a Time; put a Pint of the Juice and Vinegar, and about a Quarter of a Pound of the bruiſed Wood-lice.

Let him faſt three Hours before he has this, and ſix Hours after it.

He will like the Maſh the better for theſe Ingredients.

If his Stomach be ſo bad that he will not eat it all at once, it muſt be taken from him as ſoon as he ſhews a Diſtaſte to it, and ſet before him again in half an Hour after.

A Hog will thus be led to eat almoſt under any Sickneſs: and this is the true Method of curing his Diſorders of whatever Kind.

CHAP. IV.

For Sickneſs at the Stomach.

THE Hog, though his Stomach is naturally very ſtrong, is ſubject to Sickneſs, and will caſt up his Food. If this be not obſerved it will encreaſe upon him, and he will waſte away. The Cure is by a Change in his Food; or if it be neceſſary the Addition of a Medicine with it: but the firſt uſually anſwers.

Keep him from all coarſe Meats, and give him Beans with a little Water. If this anſwer alone, it is better than giving Medicines: if it do not, give him every Day among his Food half an Ounce of Mithridate. It will at the ſame Time warm and ſtrengthen his Stomach; and he muſt be kept to good Food for Fear of a Relapſe.

CHAP. V.

Of the Meaſles.

THIS is a common Diſorder among Hogs, and ſhews itſelf in a Redneſs of the Eyes, and Foulneſs of the Skin, and in their neglecting their Food.

The beſt Remedy is this. Keep the Hog faſting the whole Afternoon and Night. Then ſet before him a good Meſs of Victuals; not large in Quantity, but hot and well prepared, and put into it forty Grains of Salt of Hartſhorn and two Ounces

Ounces of Bole Armoniac. It will all go down very well after this Faſt; and will make a good Beginning of a Cure. The ſame Method is to be followed every Day till he is perfectly recovered, and for a few Days after, for Fear of Returns.

CHAP. VI.

Of the Lethargy.

THE Hog will ſometimes fall into what is called the Sleeping-Evil or Lethargy. He will doze all Day long, neglect his Food, and pine away.

The Remedy is a Vomit; and the beſt in the World is this.

Gather a good Quantity of Wall Pepper, called alſo Sharp Stone Crop. Bruiſe this in a Marble Mortar, and preſs out the Juice.

Keep the Creature faſting all the Afternoon and Night, and in the Morning ſet before him a warm Meſs, into which put a Pint of the Juice of the Stone Crop. He will be tempted to eat by his long Faſt; and the Hog is not very curious about Taſtes. He will vomit ſoon after he has ſwallowed it; and that ſingle Doſe will frequently prove a Cure. If this be not ſufficient it muſt be repeated next Day.

CHAP. VII.

Of the ſwelling of the Milt.

WHEN a Hog is perceived to be giddy, to reel, and to run principally on one Side, the Farmer is to underſtand that it is his Milt that is ſwelled, obſtructed, or diſordered; and if he be not relieved he will forſake his Food, and pine to Death.

The uſual Cauſe of the Diſorder is a Surfeit in feeding upon Maſt.

The Cure is this. Bruiſe a good Quantity of the Leaves and Tops of common Wormwood, and preſs out the Juice: add to this ſome Juice of Penny-royal, and give the Hog a Pint of it in every Meſs of his Victuals till he is perfectly recovered; which will be known by the Steadineſs of his Walk and Quietneſs.

CHAP. VIII.

For a Purging.

HOGS that are taken with a Flux often have it grow to a great Violence upon them, and waſte with it till they are only Skin and Bone. It generally riſes from bad Food. The Cure is this. Make a good Meſs of Food for him, and put into it half a Pound of Acorn Huſks. Obſerve whether he grow better. If he do, repeat the ſame Method till he is perfectly cured.

If this do not ſucceed, give him in every Meſs of his Food a Handful of Tormentill Roots chopped ſmall. This ſcarce ever fails of compleating the Cure.

CHAP. IX.

Of Impoſthumes or Boils.

HOGS are ſubject to Boils and hard Swellings in various Parts; and the beſt Method is to open them, and let out the Matter at a proper Time. A common Knife anſwers this Purpoſe. The Farmer muſt obſerve to watch for their growing ſoft, that being the Mark that they are in a Condition to be cut. He is then to lay the Boil open the whole Length, and preſs it on the Sides to get out the Matter; and when this is done he muſt anoint the Place with Greaſe and Tar, and it will heal preſently.

CHAP. X.

Of Foulneſs of the Skin.

THE Hog is naturally an uncleanly Creature, and the Farmer muſt therefore take the more Care to be cleanly in his Management. A wet Stye will ſubject him to Colds; and Fevers will riſe from this; but if it be wet and naſty together, which is too common a Caſe, the firſt Conſequence will be a Foulneſs, Scurf, and Scabbineſs of the Skin. The Hog will pine, and all his Meat will be thrown away upon him, unleſs this be cured.

The Blood is often in Fault in theſe Foulneſſes of the Skin, and then inward Remedies are needful: the others may be tried firſt, and if they do not take Effect, that is a Proof theſe are wanted.

Firſt bleed the Hog under the Tail, as much as can be well got away: it ought to be a Pint at leaſt. Then prepare ſome very ſtrong Soap Suds. Rub common ſoft Soap upon a Scrubbing Bruſh, dip it in the Suds, and ſcrub the Hog well all over. This will clean him.

After this waſh him well with warm Lime Water, and make the Stye clean; give him dry Litter and wholeſome Food, and after two Days clean him again in the ſame Manner, and again rub him with Lime Water.

If this do not make a Cure his Blood is infected; and Flower of Brimſtone muſt be put into all his Victuals in large Quantities. This, with the Repetition of the other will cure. If the Skin be broken in any Place it muſt be dreſſed with Tar and Greaſe mixed together; and when he takes the Brimſtone inwardly, ſome ſhould alſo be mixed in Ointment.

CHAP. XI.

For ſore Ears.

SOmetimes the Hog will have a Soreneſs about the Ears from Dirt and Filth: more frequently it riſes from the Teeth of Dogs; and the worſt is when both theſe Cauſes come together. The Dogs make the Hurts; and the Dirt

Dirt occaſions them to feſter. The beſt Remedy is this.

Warm ſome Vinegar, and waſh the Ears thoroughly with this till they are clean; then make an Ointment of Tar and Greaſe in equal Quantities, and add a little common Soap. Rub the ſore Parts with this, and repeat it till the Cure is perfected.

CHAP. XII.

Of the Pox.

THIS is a Name by which the Farmers expreſs a Diſorder of their Swine, that ſhews itſelf outwardly in a Multitude of Pimples and Blotches; and keeps the Creatures miſerable, and makes them pine and waſte.

It riſes from Wet and Filth in their Styes, and from unwholeſome Food.

The Remedy is this. Make a hot Meſs for the Creature, and give in it an Ounce of Venice Treacle.

After it has taken this let the whole Skin be well cleaned with Soap Suds, and then wherever the Sores and Pimples are, uſe the following Ointment. Melt over the Fire two Pounds of Hog's Lard, and ſtir in half a Pint of Tar. When it is taken off the Fire, put to it as much Flower of Brimſtone as will thicken it when cold into a firm Ointment. Rub this upon the Hog every Night for four Times, and keep him dry and clean, and it will commonly make a Cure in that Time.

The Farmer muſt obſerve that this Diſeaſe is infectious; ſo that he muſt ſeparate thoſe Hogs which have it from the Reſt, and not put them together again till they have been ſome Time well, and he ſees there is no Return of the Diſorder.

BOOK XIII. SECT. V.

Of the Diſorders of POULTRY.

CHAP.
1. *Of the Pip.*
2. *Of the Roup.*
3. *Of the Flux.*
4. *Of Stoppage of Stools.*
5. *Of ſore Eyes.*
6. *Of Vermin upon Poultry.*
7. *Of Sores.*

INTRODUCTION.

THESE Animals have their Diſorders like others; and their Remedies are as efficacious and certain. The Farmer will the eaſier be a Maſter of this Part of his Care, becauſe there is not the Difference between one Kind of Poultry and another, that there is between one Kind and another of the four-footed Animals. Their Diſtempers are the ſame in general of whatever Kind they be, and the ſame Remedies will make a Cure.

CHAP. I.

Of the Pip.

THIS is a Diſorder peculiar to young Fowls, and it ariſes from the Want of Water. The natural Moiſture of the Mouth in this Caſe hardens upon the End of the Tongue into a kind of Scale, and this prevents their feeding.

The greateſt Care is required to obſerve in Time which of them have the Diſeaſe, for the Remedy is eaſy.

Let ſome Bay Salt be melted in a little Vinegar and ſet ready in a Saucer. Then let the young Creatures be taken up and the Scale looſened, and then pulled off from the Tongue with the Fingers. Then wet the End of the Tongue two or three Times over with the Vinegar and Salt, and turn the Chick looſe where he cannot drink for an Hour.

This will prevent a Return.

CHAP. II.

Of the Roup.

THIS is a Diſorder ſituated in a particular Part, but it will affect the whole Body. It is a ſmall Swelling of an angry inflamed Kind upon the Rump. The Fowls that have it grow ſickly, their Feathers ſtand rough, and they pine.

When they are ſeen in this Condition, let the Farmer ſeek for the Swelling and open it with a Knife. Let him ſqueeze out the Matter, and then waſh the Part with hot Vinegar and turn the Fowl looſe. This perfectly cures.

CHAP. III.

Of the Flux.

NO Kind of Poultry can thrive, unleſs they are properly in Order with Reſpect to their Excrements; and wrong Food will throw them into Diſorders in either Extream. This of the Flux is always occaſioned by their eating too great a Quantity of moiſt Food. The beſt Re-

medy is to give them ſuch Victuals for ſome Days as tends to the other Extream: and if this fails them, to have Recourſe to more powerful Things.

Peaſe Bran ſcalded is a Food they will eat very freely; and it will commonly very well anſwer the Purpoſe.

If this does not ſet them right in two Days, rub to Powder ſome dry Roots of Tormentil and mix with it: this never fails; and they preſently grow well and hearty.

CHAP. IV.

Of Stoppage of the Stools.

THIS is the contrary Extream, and is owing to a contrary Cauſe, namely the eating too much dry and binding Meat. It renders their Excrements too dry and hard, and prevents their voiding them ſo freely as they ſhould.

In this Caſe, as the former, the firſt Attempt to a Remedy ſhould be by the Food; and if that fail theſe Medicines muſt be added.

Thoſe Cures performed by a Change of Diet are always more natural and more laſting. For this give them Bread ſoaked in Broth; and if that fails, add to the Meſs a ſmall Quantity of Manna in this Manner. Skin off the fatteſt Part of ſome Liquor in which Meat has been boiled, diſſolve in half a Pint of this two Ounces of ordinary Manna, and then put in ſome Bread to ſoak.

They will eat this very freely, and it will certainly cure.

CHAP. V.

Of ſore Eyes.

THIS Complaint is very common among Poultry, and it is eaſily remedied. Their Eyes are often hurt by Accident in their going among Briars, and pecking one another; and they are alſo ſubject to ſwell and inflame with Colds. Theſe ſeveral Diſorders ſhew themſelves in various Parts of the Eyes and Eye-lids; but one Remedy ſerves for them all. This I have repeated often with Aſtoniſhment at its Succeſs.

Gather equal Quantities of Celandine, Ground Ivy, and Clown's Wound-Wort. Bruiſe them in a Marble Mortar, and preſs out the Juice. Add to half a Pint of this four Spoonfuls of White Wine, and dipping a Camel's Hair Pencil in it, rub the Eye-lids and Eyes carefully every Morning and Evening.

CHAP. VI.

Of Vermin upon Poultry.

NAture intended great Cleanlineſs for Birds; and in their wild State they never fail to obſerve her Dictates. When they are kept in a Yard they have not always Opportunity, and whenever it is omitted they ſuffer. Their Feathers keep their Skin ſo warm, that it is a natural Place for the breeding of Vermin of many Kinds: and what is more ſingular, every Kind of Fowl, as well as every Species of Beaſt, the Eagle and the Lion not excepted, have their peculiar Kind of Louſe, which will be ſure to appear when Uncleanlineſs encourages it.

The Means of Cleanneſs according to Nature are Plenty of good Water and ſome dry Ground; the Fowls will waſh themſelves in the one; and rub and dry themſelves in the other, whenever they have Opportunity; and thus keeping themſelves clean they are free from Vermin: but when they have foul Water it ſticks to their Skins, and gives Filth inſtead of cleaning it away.

Therefore to prevent the Evil, let the Farmer always take Care there be good Water; and a dry Soil in ſome Part of the Yard.

When it is come on the Remedy is this. Boil a quarter of a Pound of white Hellebore Root ſliced in two Quarts of Water to a Pint and a half. Strain this off, put it into a Quart Bottle, and put to it an Ounce of beaten Pepper, and half an Ounce of Scotch Snuff. Waſh the Skin wherever the Vermin are found with this, and it will prove a certain and a ſpeedy Cure. But if they be not thoroughly killed they will ſoon breed again.

CHAP. VII.

For Sores.

SORES and Swellings will often appear upon Fowls in different Parts of the Body, and they never fail to make the Creatures pine.

When Poultry droop, and their Feathers hang rough, let the Owner take them up and examine them carefully, he will uſually find ſome ſuch Diſorder.

The Cauſe is uſually bad Food, or bad Water, and ill keeping.

The Remedy is this. Melt together in a Pipkin equal Quantities of Reſin, Butter and Tar. When the Sore is found bathe it firſt with warm Milk and Water, and then dreſs it with this Ointment. Two or three Dreſſings uſually make a Cure; but they muſt be kept more carefully to prevent a Return.

End of the Thirteenth Book.

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Compleat Body of HUSBANDRY.

BOOK XIV.

Of the Diſtemperatures of Trees, Roots, and Herbage, from the Injuries done by Inſects, larger Animals, and Weeds.

In THREE SECTIONS.

SECT. I. *Of INSECTS.*

INTRODUCTION.

WE have laid before the Farmer at large the ſeveral Accidents to which his Crops and his Cattle are liable, from the Seaſons and other natural Cauſes; and it remains that we treat of thoſe Diſtemperatures which may be termed accidental, becauſe they are owing to the Hurts of Inſects.

Theſe, though very ſmall Creatures, yet by their Number are able to do great Damage. This will be beſt guarded againſt by thoſe who moſt thoroughly underſtand the Nature of thoſe Creatures. We ſhall therefore treat of theſe ſeverally according to their Kinds, and explain to the Farmer their Natures and Qualities; the Accidents, ſo far as they can be diſcovered, which cauſe their abounding at certain Times; and the Methods by which Vegetables of all Kinds, under the three diſtinct Heads of Trees, Roots, and Herbage, may be preſerved from them: founding all in this Part, as the preceding, on Experience.

CHAP. I.

Of the Ant.

THIS little Creature is a very troubleſome Enemy to the Farmer in many different Articles, and muſt be deſtroyed in ſome Caſes, and guarded againſt in others with the utmoſt Caution.

In Paſture Ground it raiſes Hills, which we have already ſhewn the Methods of cutting up and deſtroying: and in plowed Lands it will eat vaſt Quantities of the Seed before it ſprouts. Birds devour much of it, but they wait to ſee the Shoot; otherwiſe they know not where to ſeek for it: but theſe little Enemies, whoſe Number enables

enables them to do vaſt Miſchief, partly by what they deſtroy, and partly by what they carry away, follow it into the Ground, and are themſelves unſeen, as well as the Havock they make, till the Farmer finds the Misfortune in his poor Shoot. We ſhall direct him to perceive it ſooner, for then it is too late for Remedy.

The Ants are great Breeders, and they are diſtinguiſhed according to their Sexes: the Males have Wings, the Females none. There are ſeveral Kinds of them, the largeſt living in Woods; but theſe do little Miſchief. The ſmall common Ant is the Kind ſo hurtful to the Farmer.

Their Eggs are ſmall and round, and they are ſeldom ſeen or regarded; what is commonly called the Ant's Egg, is a thin Shell or Caſe, in which it lies while the Wings are forming. It is ſtrange, People could ſuppoſe Ants laid Eggs larger than their whole Body: but this is the Explanation of the Error. All Inſects that have Wings lie in a ſtill State ſome Time; the Silk-Worm, the Caterpillar, the Bee, and all others. This called the Egg is the ſame State of the Ant; and as they are utterly unable to move, during that Condition, the reſt take Care of them, carrying them to Places of Safety.

The Miſchief they do to Trees is by eating off the young Buds; but this is only of a few particular Kinds. Some Fruits alſo they are fond of, as is ſeen in Gardens. In Graſs-Grounds they do no Harm but by thoſe Hills, which are troubleſome enough. In new-ſown Corn-Fields they are moſt deſtructive, creeping in at the Chinks and Crannies of the Ground, and ſpoiling more than they devour or carry away. They are like the Wolf in the Fold, that will tear twenty Sheep to Pieces when he eats but of one.

Thoſe Kinds of Grain are moſt ſubject to this Injury, that have the thinneſt Skin and the ſweeteſt Flour. Therefore Wheat is moſt ſubject to their Depredations; and the ſmalleſt Wheat the moſt: partly as its Skin is thinneſt, and partly as it is eaſieſt of Carriage.

Barley they will attack, eſpecially that which is beſt, waiting till it is ſomewhat ſoftened in the Ground.

The other Kinds that ſuffer moſt, are Hemp, Flax, and Cole-ſeed.

Rye they are not very fond of; and all Kinds of Pulſe are ſafe, for they do not like them; the Skins are too thick, and the Meal too bitter.

In Gardens they are miſchievous in the ſame Manner, eating one half of the Seeds that are put into the Ground.

The Remedy is the deſtroying them; and this is to be done ſeveral Ways. Firſt let the Farmer find their Neſts, which are under Hedges, about the Stumps of old Trees, and on little Riſings of Ground.

Let him carry wet Straw to theſe Places, cover all the Neſts, and fire it. The Smoak will deſtroy them. And if once going over the Ground do not anſwer the Purpoſe, it muſt be repeated.

The Time for doing this is half an Hour after Sun-ſet, for they are then all together. In Gardens 'tis a good Method to pour boiling Water upon their Neſts, taking the ſame Time for it.

This is the Way to deſtroy Ants; but there is alſo a Method of preventing their Breeding. They hate Lime-Soot and Aſhes; theſe are all good Manures, and ſhould be uſed where Ants are moſt likely to come. 'Tis alſo a good Method to dreſs the Land with theſe after they have been choaked with burning the Litter. This perfects the Deſtruction of them, and they are ſeldom found to infeſt ſuch a Piece of Land afterwards.

CHAP. II.

Of Beetles.

THE ſeveral Kinds of Beetles are innumerable; we have them from the Stag-horned Kind, which is nearly as big as a Wren, to the ſmall black Beetle of the Roſe-buſh, which is ſcarce big enough to be viſible.

They are all bred the ſame Way, and many of them are great Devourers. The Farmer is aware of them in their winged State; but there is another Condition in which they do him greater Damage.

In the End of Summer they lay their Eggs juſt under the Surface of the Ground. Theſe hatch into thick white Maggots with ſix Legs, and after a Time of Reſt they come out with Wings, in the proper Form of a Beetle.

In the Maggot or Grub State, they eat the Roots of Graſs and Corn; and ſometimes they are very terrible in this Deſtruction. Eight Years ſince they almoſt caus'd a Famine in Norfolk.

In the Beetle State they prey upon Corn in the ſame Manner as the Ants. They creep into the Cracks of the Ground, and devour the beſt Grains. Their Time of Miſchief is when the Grain is ſwell'd, and before it ſhoots.

They are more univerſal Deſtroyers than the Ants, for they have ſtronger Jaws, and leſs Nicety in their Taſte. There is no kind of Grain or Pulſe ſecure againſt them.

The Method of deſtroying them is this.

Juſt before the Sowing, carry ſome wet Litter into the Field; lay it in Heaps, and about Evening ſet Fire to it. That Fuel is beſt which makes moſt and thickeſt Smoak. They lie concealed in Buſhes and Hedges, but they fly at Evening with the Owls: this is therefore the Time to deſtroy them or drive them away. They are afraid of Smoak as much as the Ants, and they will be choaked in great Numbers by it; and what eſcape Deſtruction will get far off.

The ſame Manures that are uſeful againſt the Ant, are in like Manner ſerviceable againſt the Beetle: and it is a very good Method, where they are very plentiful, or a Field is particularly in Danger, to ſcatter Lime over it juſt after Sowing.

The ſteeping of Seed-Corn in Brines, and other Liquors, we have treated of in its Place: one great Uſe of that Practice is defending the Corn from theſe Devourers; therefore, wherever there is particular Danger either from Ants or Beetles, the Farmer ſhould be ſure to put thoſe Ingredients into the Brine which are moſt diſ-

agreeable

agreeable to them or moſt deſtructive of them. Among all theſe Ingredients nothing defends Corn ſo well againſt the Beetle as Urine.

CHAP. III.

Of Worms.

THE Gardeners imagine that Worms do them no Harm; but thoſe who have obſerved the Courſe of Nature in the Field, can tell them they miſtake. There is a particular Time at which they feed upon the Grain; and they are ſo numerous, that the Deſtruction is very great.

The Worm is produced in the common Way of other Animals; but it is particular, that each Creature of this Species has both the Sexes. This promotes their large Increaſe: and as they have nothing of that Change to undergo, which we have ſhewn muſt happen to all Winged Inſects, there is no Stop in their Growth, and they arrive ſoon at Perfection.

There are three principal Kinds of Worms, the great and ſmall red Worms, and the Olive-colour'd.

Of theſe the ſmall red Worms are the moſt deſtructive. They are too common in good Lands naturally; and Multitudes are alſo brought on with the Dung.

The Time when they deſtroy the Corn is juſt when it has ſwell'd, and is beginning to ſhoot for the Blade and the Root. They at this Time prey upon its tender Subſtance, and are the Occaſion of ſometimes Two-thirds of a Crop miſſing.

A good Method of deſtroying them, is to drive a Number of Nails half way in upon the lower Part of the Plough which goes into the Ground. Theſe tear the Worms to Pieces in great Numbers; and they are alſo very uſeful in the breaking the Ground more fine.

This is therefore, on all Accounts, a very good Method.

Another Way is, to make Fires of wet Litter on different Parts of the Land. This deſtroys many of the ſmall Worms that are neareſt the Surface, and they are what do the Miſchief.

But the greateſt Remedy of all is to ſteep the Seed-Corn in a proper Brine.

The Taſte of Copperas is hateful to Worms; and they are no Way better guarded againſt than this.

It is ſuppoſed Hemp is deſtructive of them, or hateful to them, but Experience ſhews this to be an Error. I have ſeen Corn, ſteep'd in a Decoction of Hemp, devoured in the ſame Manner as if nothing had been done to it, and utterly eaten to Pieces. The beſt Preſervative of all, is to ſprinkle Lye over the Seed-Corn after ſteeping, and then to ſift Lime over it, and ſow it, well covered, with both. Theſe Taſtes continue with it longer than others, and are therefore more effectual.

CHAP. IV.

Of Slugs.

WE have named the principal Deſtroyers of Crops while in the Ground; and are now to conſider the Devourers of them when they have ſprouted: and of theſe none is ſo fatal, ſo numerous, or ſo hard to be conquered, as the Slug.

By this Name the Farmer expreſſes the naked Snail. It is of two Kinds, a large black and a ſmall brown one. The black is the greateſt Devourer; but the other is more apt to eſcape Deſtruction, becauſe unſeen, by being ſmall and of the Colour of the Ground.

Theſe are ſo very fruitful a Creature, that they will, in Places where there is any Shelter near, encreaſe faſter than it is poſſible to deſtroy them.

A Gentleman of Veracity, who has a ſingle Acre of Garden, aſſures me that he has, one Day with another, kill'd with his own Hand, ſixty or ſeventy of theſe Creatures, Morning and Evening, during the Summer, for theſe twenty Years, and yet he finds to this Day as many as ever.

In Gardens theſe Creatures eat the Hearts of new-planted Kitchen-Herbs; but in Fields they get a little within the Surface, and eat the firſt Shoots of the Crop.

The Stalk which is to ſupport the Ear, together with the Rudiment of the Ear, and of every Grain it contains, lie in this firſt Shoot, and this is eaten off by theſe miſchievous Creatures.

The ſmall brown Slug is moſt deſtructive of Wheat and other Grain; the great black Slug of Pulſe.

The ſteeping of Seed-Corn is of no Benefit in this Reſpect, becauſe no Taſte from thoſe Ingredients gets up to the Shoot. Therefore other Defence muſt be thought of againſt theſe Enemies.

Experience ſhews they are moſt frequent on Land manured with Dung; and that feweſt of all are found where the ſharpeſt Manures are uſed, ſuch as Lime, and the like.

Of all the Taſtes that can be thrown among them, two are found moſt diſagreeable to them; theſe are Lime and Soot.

This will give the Farmer his firſt Inſtruction againſt them.

He knows the Time when they will come to be miſchievous, and he has before him the Ingredients that can do moſt to prevent it.

Let him have ſome freſh and ſtrong Lime ready; and about eight Days after the ſowing of the Corn, let him have one or more of his Chimneys ſwept for Soot. Let him mix together equal Quantities of the freſh Soot and Lime, and ſprinkle it over the Ground.

This will greatly promote the Strength of the Crop, and at the ſame Time poiſon Multitudes of theſe Vermin.

If he can have the Advantage of a Shower about this Time, let him by all Means order the

Soot and Lime to be thrown on ſoon afterwards: if not, the beſt Time is very early in the Morning; becauſe they are then out, and upon the Surface of the Ground. The Lime falling upon their Bodies, kills them; and the Taſte and Effect of it will remain ſeveral Days upon the Land, as a Preſervative againſt thoſe which have eſcaped.

In ſmall Pieces of Ground, a Mixture of Soap-Lees and Tallow-Chandlers Greaves, deſtroys them utterly.

CHAP. V.

Of Graſhoppers.

THESE are Enemies of which the Farmer is not ſo much aware, as of many others which do him leſs Damage. They are not ſo common in his Crops as the reſt, which are in a Manner univerſal; but where they come they are extremely deſtructive.

They feed upon the Shoot as ſoon as it appears above the Ground, and are very miſchievous to the Summer-Corn, and other late ſown Crops. They eat theſe down ſo very deep, that frequently there is never another Shoot made, but the Grain dies, rotting in the Ground.

The Remedy againſt theſe Creatures is of a peculiar Kind. It is found that they cannot endure the Taſte of Bitters of any Sort. This is not ſingular; for many Inſects beſide theſe, and even ſmall Birds, are deſtroyed by thoſe Bitters, which we take with Safety and Advantage, in the ſame Manner as if they were the moſt fatal Poiſon. An Infuſion of Gentian will kill moſt of the ſmall Birds; yet, to us, it is a very wholſome and excellent Stomachic: on the other hand, there are Worms that feed on Pellitory of Spain, which is ſo hot we cannot endure it in our Mouths without Pain.

The Farmers who have, from Father to Son, a Tradition of this kind, boil Wormwood in Water, and ſprinkle it over thoſe Crops which the Graſhopper is devouring. But there is a much more powerful Remedy.

Coloquintida is the moſt hateful Bitter in the World; and a very ſmall Quantity of it will give its Taſte to a vaſt deal of Water. This ſhould be ſprinkled on the Crop, and will never fail.

CHAP. VI.

Of the Locuſt.

THE Graſhopper naturally leads to the Locuſt, as it is only a ſmaller Animal of the ſame Kind; but this terrible Deſtroyer we are little acquainted with in Britain. We were threatened with a Swarm of them ſome few Years ſince; and, as it is poſſible, they may come at ſome other Time, tho' we have all the Reaſon imaginable to hope not, it may not be amiſs thus ſhortly to mention them.

They devour the green Crop of any Kind, and in any Degree of Growth; and when they come in ſuch Swarms as to cover the whole Ground to a great Depth, there can be no Remedy. If they ſhould ever threaten our Crops, it would naturally be in a leſs Quantity; and the Preſervation would be in the Method juſt directed. Coloquintida ſhould be boiled in Water, and the Liquor ſprinkled over the Field. This would indeed be worth a Tryal againſt other Inſects, particularly in Gardens; but it is not yet recommended upon Experience. It is a Taſte ſo extremely nauſeous, that probably no Creature would eat any thing wetted with it.

CHAP. VII.

Of the Caterpillar.

CAterpillars are of innumerable Kinds, like the Beetles and their Maggots. They are the Young of the Butterfly-Species, and are as various in their Form, Size and Colours, as thoſe winged Parents from whom they ſpring.

The Butterfly is directed by Nature to lay her Eggs upon ſome particular Plant; and there the Caterpillars are hatched. This Plant is to be their Food, therefore the Farmers and the Gardeners Crops ſuffer moſt becauſe they are well taſted: and the Creature devours immoderately, and does vaſt Miſchief.

After it has lived the appointed Time in this State, it ſpins a Web; and in that waits the Change into a Butterfly: thence it iſſues, like the Parent Animal, to lay the Foundation of another Brood.

Trees ſuffer as much as ſmaller Plants by theſe Creatures; they will eat up the whole Quantity of their Leaves ſometimes in a very ſhort Time.

In the Fields the Pulſe-kind are moſt ſubject to them; and it is very eſſential to guard againſt them.

In Plantations of Trees their Neſts ſhould be ſought, after the Leaves are fallen; for many Kinds of them breed in this Manner in great Numbers, the Eggs remaining in the Neſt or Bag all the Winter, and hatching juſt when the Leaves come out in Spring.

Theſe Neſts are generally at the Extremities of the Branches of young Trees, and the beſt Method is to cut off the Tip of the Branch and deſtroy them.

In Fields they have not this Courſe of Breeding, for what ſuffer moſt by them are the Summer Crops. When the Farmer ſees them in any Number, or perceives by their Havock that they are numerous enough to do him Miſchief, his Remedy is this:

Melt ſome Pitch in an Earthen Pipkin, and put to it ſome Flour of Brimſtone. Let it cool, and divide it into ſeveral Lumps.

Place ſmall Heaps of Straw in different Parts of the Field, and on each lay one of theſe Lumps of the Pitch and Brimſtone. Set Fire to the Straw, and the other Ingredients will melt and burn among it; and every Caterpillar that

is within the Influence of the Smoak, will fall off and periſh.

If once be not ſufficient, the ſame Practice may be repeated; and if the Farmer be diligent, he need not fear Succeſs. The Art is diſpoſing the Heaps in ſuch Manner, that no Part of the Ground may be free from the Smoak.

In Gardens and ſmall Plantations of any kind uſe the following Method.

Boil ſome Tobacco in Urine, and add to it ſome Soap-Lees. Sprinkle where the Caterpillars are, and it will deſtroy them.

CHAP. VIII.

Of the Grub.

WE have informed the Farmer in general, that the Grub is the Worm or Maggot produced by the Eggs of the Beetle. But there is one particular Kind of this Creature more deſtructive than the reſt; and when the Grub is mention'd without any particular Diſtinction, this Kind is meant.

This is a thick, ſhort, whitiſh Worm, with a hard red Head, and ſix ſhort Legs. It is found among the Roots of Barley and other Corn, and does prodigious Miſchief; eating off the firſt Shoot juſt above the Huſk. It feeds on the ſweet Matter of the Corn, which is at that Time a kind of Pap, like Cream; and leaves the Shoot to wither, and the Body of the Seed to decay.

This miſchievous Creature is the Produce of that Inſect we call the Cock-chafer, which is ſo abundant in Hedges in Summer-Evenings.

It is an endleſs Taſk to think of deſtroying the Grub, becauſe it lies at ſome Depth under the Ground; but there is no great Difficulty in preventing the Danger, by deſtroying the old ones, to whoſe Eggs the next Brood muſt be owing.

We have directed the Farmer to defend himſelf againſt Beetles in general, by making a great Quantity of a ſtinking and ſmothering Smoke; and the ſame Method is to be practiſed here.

He is to burn wet Stubble under all his Hedges; and he will by this Means certainly either deſtroy or drive them from his Grounds.

CHAP. IX.

Of Flies.

THESE are as innumerable in their Kinds as the Beetles or the Caterpillars, and no Inſect is more deſtructive of the Farmer's Crops.

We have already ſpoken of the Damages they do to Turnips, and to other young Shoots of uſeful Plants, under the ſeveral Heads where thoſe Articles are treated of at large; we ſhall therefore refer the Reader to their proper Place for theſe particular Conſiderations; but ſhall here give a general Account of this deſtructive Creature, and mention thoſe Particulars which have not occurred before in their Place; and with this cloſe the Account of the Farmer's Inſect-Enemies.

Among the Fly-kind thoſe which are the moſt conſpicuous are the leaſt hurtful. The larger Species being, for the moſt Part, harmleſs; and the ſmalleſt, in the higheſt Degree, miſchievous.

The Dragon-Fly, of which we have many beautiful Species, frequent about Waters, and which the Ignorant have diſtinguiſhed by the Name of the Horſe-ſtinger, has neither that, nor any other Hurt in its Diſpoſition: a harmleſs Inſect, form'd to wanton in the Fields of Air, to amuſe us with its Beauty, and the Rapidity of its Flight; and to do nothing to injure us. Its Brood are hatched in the Waters, where they are the Prey of Fiſhes, but never come in the Way of doing Mankind Damage.

It is much the ſame with the reſt of the large Kinds of Fly. They wander from Place to Place, and feed at Random upon leſſer Inſects, or upon uſeleſs Vegetables: but it is much otherwiſe with the ſmall Sorts. They herd together in innumerable Droves, ſettle upon the Boughs of uſeful Trees or Plants, and deſtroy and pervert the Courſe of Nature by their Sucking.

Wherever theſe appear, the Method for deſtroying them is by proper Smoaks; for nothing elſe can properly and perfectly reach them; but there are Ingredients to be uſed in this Manner, which ſpread their Effects ſo far, and operate ſo powerfully, that it is ſcarce poſſible for theſe Deſtroyers to eſcape or to ſupport themſelves againſt their Influence.

Books written on theſe Subjects, abound with Receipts for Liquors to ſprinkle over Plants covered with theſe little Deſtroyers; but theſe are trifling to the Method by Smoak, which is to be ſent among them much more eaſily, and ſpreads its Influence more univerſally.

For the Deſtruction of Flies of a larger Kind, that have ſeiz'd upon a Crop, a Quantity of Feathers may be burnt among wet Straw, and theſe give ſo offenſive a Flavour to the Smoak, that the Creatures will ſometimes be driven away entirely; but oftener, when only driven away thus, they return again. The Method that is therefore moſt eligible, is to kill them.

The Smoak of Brimſtone is, beyond all other Things, efficacious to this Purpoſe: there is a ſuffocating Steam attends it which no Creature can endure.

This is therefore very proper when it can be uſed conveniently, but it does not ſpread its Effects far. A few Matches burnt under a Place where there are a ſmall Parcel of theſe Vermin, will ſtifle them all, but there is no ſpreading the Influence of this over a whole Field.

As Sulphur is confined in its Sphere of Operation, there is a Drug called Orpiment, that is, of all known Subſtances, the moſt extended; and, happily for the Farmer, the Smoak of this is offenſive beyond all other Things.

A Dram of this will make as much Smother as a vaſt Quantity of Straw, Stubble, or any other ſuch Material; and the Smell is like that of Garlic, only vaſtly more offenſive.

This is the Farmer's beſt Safeguard againſt the Fly which ſeizes innumerably upon many of his Crops. He need not be afraid to uſe it, from its

its having been called by ſome a poiſonous Subſtance; for that ariſes only from an Error: it is a common Thing to call yellow Ratſbane by its Name, but that is a Thing altogether different. Yellow Ratſbane is made by Art; but the right Orpiment is found natural in the Earth: and the Farmer's great Care muſt be to purchaſe it of an honeſt Perſon, and to explain what he does, and what he does not mean.

There needs no Addition to this; and there is very little Trouble in the uſing it.

Let the Farmer who has Crops over-ſpread with theſe Deſtroyers, take the Advantage of a Day when there is a little Wind; and place himſelf ſo that it may convey the Smoak he ſhall make directly upon his Crop. Then let him light a few Pieces of Charcoal, and ſet over theſe a Fire Shovel with an Ounce of Orpiment beat to Powder.

There will preſently riſe from it a thick white Smoak, of a moſt offenſive Smell. He will not be incommoded by it, becauſe the Wind drives it from him; but it will ſpread over a vaſt Space of Ground: if the Field be ſmall once burning will do; if larger, it may be repeated in two or three Places.

I have ſeen this tried in different Inſtances, and with various Effect. It hurts no Crop, and moſt Kinds of Flies are deſtroyed by it; but there are ſome it does not kill.

BOOK XIV. SECT. II.

Of Damages from larger Animals.

CHAP. I.

Of Mice.

FIELD Mice are as numerous as thoſe of the Houſe, and the Farmer often finds them as troubleſome, and ſometimes much more ſo. There are ſeveral Species of them; but they are all equally his Enemies: all feeding upon his Seed-Corn and Pulſe in the ſame Manner; and are all to be deſtroyed by the ſame Means.

Drier Lands are more ſubject to this Kind of Vermin than thoſe which lie wet; and of all the Kinds of ſowing, that under Furrow moſt expoſes the Seed to them.

In this Caſe, as the Furrows will fall ſomewhat hollow, they afford a Shelter to the Mice at the Time of their committing all their Havock.

The Farmer ſeems to contrive for their feaſting and Safety together in this Method; for the Corn or other Seed lies perfectly expoſed to them, and they are not expoſed to his Eye while they are feeding upon it.

In theſe Lands I have with great Concern often traced the Path of thoſe Devourers, and ſeen all eaten up, or carried away to ſome little Diſtance: for under the Covert of this Manner of Tillage they will make their Neſts and Granaries as it were in different Places; and the Seed ſhall be found ſtored up in one of theſe, that ſhould have covered a great Space of Ground with its Shoot.

The Huſbandman will by this ſee a great Diſadvantage attending that Kind of Tillage; and he will know in what Fields he is moſt to fear theſe Enemies.

Though this Manner of ſowing gives the Mice an Advantage, the other Way does not ſufficiently ſecure the Corn from them. When it is ſown in the common Way and harrow'd in, it is better covered; and there is a great deal more Trouble for them to get at it: but they are very induſtrious, and in this Caſe will dig after it, and tear up and deſtroy a great deal.

When it is ſown under Furrow they begin with it as ſoon as it is in the Ground; but when it is harrowed in they wait for its firſt Sprout. This gives the Farmer an Advantage, becauſe he knows exactly when he is to expect them; and it is a great Article of Safety to know when to guard againſt the Danger.

The careful Huſbandman is not in this Caſe to wait till he ſees the Shoot of his Seed; for the Mice have very quick Eyes, and they will perceive it a Day or two before he does: he is therefore to look to his Ground a Day or two before the Time of its being ſeen covered with the young Shoot; and then, as he knows the Devourers will be about, he is to prepare for their Deſtruction.

Traps are a very poor Method of getting rid of theſe Creatures. There is no Way well worth his Conſideration but Poiſon; and happily for him there are Drugs which will anſwer this Purpoſe of Poiſon to theſe Creatures, which are not literally and ſtrictly Poiſon to ourſelves. Theſe he is to uſe, and they will ſufficiently anſwer his Purpoſe. It would be a diſagreeable Thing to be meddling with Ratſbane; but there is no Harm in handling the Ingredients he has to uſe.

In the firſt Place let him conſider what Fields from their Soil are moſt likely to harbour Mice, and in what Places he has known them moſt miſchievous. Let him never ſow theſe under Furrow, for that takes from him all Opportunity of attacking his Enemies: they work under Ground as it were, and will never come into the Way of his Poiſon.

When theſe Fields have been ſown otherwiſe, and harrow'd over, the Mice muſt come upon the Surface and dig down for the Corn, and they will then certainly meet with any Thing he lays on the Ground for them.

Let him mix up a Peck of Barley Meal, a Pound of Powder of white Hellebore Root, and four Ounces of Powder of Staves-Acre; and when theſe are all mixed together by ſifting through a coarſe Hair Sieve, add half a Pound of Honey, and as much Milk as will work the whole into a Paſte.

Let this be broke into Pieces, and ſcattered over the Field at the Time when the Mice are known to be coming. They will eat it greedily, and it is certain Death to them. There is nothing in any of the Ingredients diſagreeable to the Taſte when thus mixed; and every Morſel of it will be devoured. The Mice will be kept from digging after the Corn; and at the ſame Time killed by the Ingredients.

This is the Method to be uſed juſt at the Time of Danger; but the Farmer who has a Field peſtered with theſe Vermin, will do well to be thinking at other Times alſo of deſtroying them.

They live at a ſmall Depth under Ground, and there breed in Abundance. The Paſſage into their Neſt is by a little round Hole, and theſe are eaſily ſeen in dry Weather.

On theſe Occaſions the Farmer ſhould go his Rounds with a Quantity of the Paſte before directed; and wherever he ſees a Hole throw in a Piece. A little Trouble of this Kind taken from time to time in the Heat of Summer when the Holes are moſt conſpicuous, would utterly root them out.

CHAP. II.

Of Moles.

THESE are ſubterranean Enemies of another Kind; but in their Way do as much Miſchief as the former. We ſee their Hills in Paſtures, where they work under Ground at a ſtrange Rate, and are very hurtful; but the Damage they do to Corn is much greater; and frequently comes upon the Farmer quite unexpectedly. He knows that the Ants and the Mice will eat the Grain when newly ſowed, and that the Slugs will deſtroy it when juſt ſhot up; but when theſe Times are over he is at Reſt on thoſe Heads. On the contrary, there is no Time at which the Mole may not deſtroy his Crop.

This Creature formed for living under Ground preys upon the Roots of Plants, and is fond in a particular Manner of thoſe of Corn; but beſide the Quantity they deſtroy by eating, they damage a vaſt deal more by undermining the Ground. 'Tis hard to be conceived what Havock one Way or other a ſingle Mole will make in a Field of Corn; or in how little Time, one of theſe Creatures will burrow through a third Part of an Acre in a Day; and this perhaps at a Time when the Corn is half grown.

The drieſt Lands are the moſt ſubject to theſe Animals, but they will get into any; and there is no Creature of all the Number to whoſe Injuries the Farmer is expoſed, againſt which it is ſo difficult to guard. There is no foreſeeing when they will come; but it is very important to know of their being in the Ground as ſoon as poſſible, in order to ſtop the Deſtruction.

The only Caution in the Farmer's Power is to obſerve whether there are any there at the Time of plowing; and if there be, he is to uſe every poſſible Method of deſtroying them: if not, he is to examine whether the Lands neareſt his own every Way be infeſted by them, or clear from them.

The freer they are they more likely he is to be clear of them; but there is no Certainty from this; for there are Times when they will come without any poſſible Manner of gueſſing from whence; and they will ſometimes have done irreparable Miſchief, before 'tis diſcoverd they are in the Place.

The next Caution to this of knowing when to expect them, is the deſtroying them when found. They are a very defenceleſs Creature, and not very cunning. Their only Security is the being hid under the Surface; and they betray themſelves in that Retreat by the Manner of their working.

The Huſbandman, whoſe Crop is ſuffering by them, is to look for the Tracks where they have gone; and theſe he will eaſily ſee by the different Colour of the new turned up Earth.

He is to follow the Courſe of one of theſe Paſſages, when he has got Sight of it; and he is to dig croſs Holes in it, and to watch the going out or coming back of the Mole. And wherever it is caſting, to ſtrike it through with an iron Inſtrument made for that Purpoſe. The Traps for catching them are alſo common, cheap, and of a plain Structure. Indeed the Deſtruction of this Creature is ſo eaſy, and ſo many are ready to undertake it at a trifling Price, that the Caution we firſt gave is the moſt important; which is the finding as ſoon as poſſible where they are growing miſchievous.

In ſome Places the Farmers content themſelves with driving them out of their Fields; and this is to be done by ſmoaking them, as other Creatures of a leſſer Kind are deſtroyed.

To this Purpoſe they open their Paſſages in ſeveral Places, and burn Heaps of Straw and ſome Brimſtone. This will drive the Moles out of a Corn Field ſpeedily enough; but this is not a ſafe or eligible Method. It is only ſending them out of ones own Ground into ones Neighbours, who may in the ſame Manner drive them back again. This is only a temporary Relief; and there is none wiſe or effectual but their Deſtruction.

CHAP. III.

Of Birds.

WE have gone through the Inſect and creeping Tribe of Enemies to the Farmer; and come to the flying. Theſe are as hurtful, and they muſt be guarded againſt by other Means. Thoſe who are unaccuſtomed to theſe Things will be ſurpriſed to ſee to how many Accidents, and to what a Variety of Devourers, the Huſbandman's Crop is expoſed. They will wonder any Care preſerves it from them; but certain it is that Care is neceſſary, or there will be but a poor Chance of eſcaping them.

Corn is open to a vaſt Variety of Birds, larger and

and ſmaller, from the Crow to the Sparrow; and they are continually ſeeking after it, from the Time it is out of the Seedſman's Hand in the Field, to the houſing it up in the Granary.

The ſmall Birds will follow the Sower, and one would think they would devour it as faſt as it comes from his Hand: from that Time they are daily ſeeking after every Grain that does not lie too deep for them; and they will in Spite of the beſt Care eat a great deal.

When it is about to ſhoot, the ſly Rook comes in. He perceives, as we have obſerved, the firſt Spire that gets above the Surface, before the Farmer's Eye ſees the leaſt Appearance of it; and he tears up a great deal. There is no Seed the Farmer ſows that is not a proper Food for theſe Devourers. They fall upon all alike, and happy for the Huſbandman it was, that in the old Way of ſowing, a great deal more Seed was allowed than was needful for the abſolute Growth.

The beſt Defence and Safety againſt theſe Devourers is the new Method of Huſbandry.

Drill ſowing gives great Security to the Seeds in general; and it limits the Time of the Danger of its being devoured, ſo that it is much more eaſy and cheap to protect it.

There is nothing of all that Loſs of the Seed as ſoon as thrown from the Hand; nor can theſe rapacious Creatures pick it up Day by Day afterwards as it lies expoſed; 'tis covered by that Practice, and the ſole Danger is juſt when it begins to peep above Ground. If a Boy or two be employed juſt at that Time to fright the Birds away, it is naturally ſecure at all others.

The ſteeping of Seed is another Defence againſt Birds; for they will hate the Taſte and neglect it.

A good Cuſtom would be to let a Perſon follow the Seedſman in the common Way with a Piſtol, diſcharging it frequently among the Cluſters that follow; hanging up any he chances to kill on a Stick by the Way.

This will defend the Seed in ſome Meaſure as ſown; and the ſame Practice will be uſeful afterwards when it begins to ſprout.

This will be needful whatever Method of Huſbandry has been followed; for the Rooks and other Birds will tear up the Seed from any Depth where they ſee its firſt Shoot.

Therefore about a Fortnight after the ſowing of Barley and other Summer Corn, and about ſix and twenty Days after the ſowing of Wheat, Rye, and the like, in Autumn, let a Couple of Boys with Piſtols be ſent into the Field. Guns are unmanageable for ſuch Perſons, and the killing is not ſo much the Purpoſe as the frighting. Any Servant of the Farmer's may with a Gun kill a Crow or two, or half a Dozen Sparrows, in any other Place, and they may be ſtuck up in the Field. The Boys need only fire Powder, and they will thus weary and fright the Birds away.

This Method and no other will defend the young Crop. It is but for a few Days that it is required, and no Servants the Farmer employs in his whole Profeſſion ſo well earn the Price he pays them.

Morning and Evening are the Time of Birds feeding. The Boys muſt be ſent into the Field an Hour before Sun-riſe, and muſt ſtay half an Hour after Sun-ſet; and theſe are the Times when they muſt be moſt vigilant. In the Middle of the Day there is leaſt Danger, and the moſt Damage of all is done at Day-break.

We have thus given the Farmer a general View of all the Dangers to which his Crops are expoſed from Animals; and the Methods found moſt ſucceſsful in preſerving and defending them againſt them.

One farther Damage there is to which he is expoſed, and this is from other Plants: of this we are to treat in the enſuing Chapters.

BOOK XIV. SECT. IV.

Of the Damage from WEEDS.

CHAP. I.

Of the Nature of Weeds.

WHEN the Farmer has been at the Charge of enriching and tilling his Ground, he expects the Advantages of his Labours and Expence; and wiſhes the Improvements he has made in the Land may give all its Fertility to his Crop: but he is to conſider Nature ſows while he is ſowing; her Proviſion for keeping up the Species of Plants is very wonderful; their Seeds are ſcattered to great Diſtances, and where they fall they grow. While the Seeds of ſome Plants are winged with Down to make them float upon the Air, the Roots of others are ſo full of Life, that the leaſt Morſel of them remaining in the Ground will grow.

'Tis not with Plants as with Animals: in theſe the Loſs of a Limb or other eſſential Part cannot be reſtored, except in ſome few particular Kinds: but in Plants, while any thing remains the whole will be renewed.

Hence is the Origin of Weeds to be trac'd by the Farmer, and hence he will find them univerſal.

He is according to this diſtinct Manner of their Growth to divide them into two Kinds; the Perennial, or thoſe which commonly riſe

Annual Weeds

Charlock

Poppy

Corn Marygold

Melilot

May Weed

Cockle

Sow-thistle

Perennial Weeds

Rest-harrow

Colt's-foot Leaves

The Colt's foot Flower

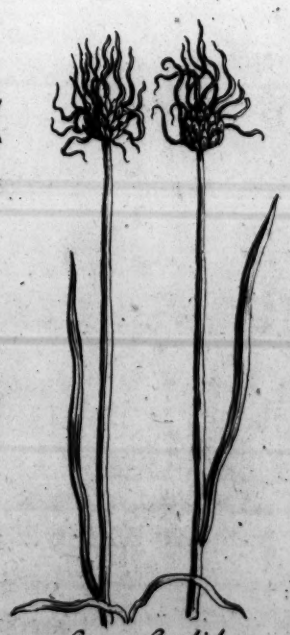
Couch Graſs

Thistle

Spear Thistle

Fern

Broad leavd Garlick



Crow Garlick

Wild Oat

Engravid for the **Compleat Body of Husbandry**, printing, by the King's Authority, in weekly Numbers, at 6d. Each.

from Roots left in the Ground; and the annual, which ſpring from Seeds brought on by the Winds.

A perennial Plant is one whoſe Root lives through the Winter, and ſhoots afreſh in Spring. The Seeds of theſe may be brought on by Winds; but they are moſt pernicious when they riſe from Roots; the Miſchief lying deeper, and the Plant being ſtronger.

The annual are ſuch as riſe from ſcattered Seeds: theſe flower during Summer, and die when they have perfected their own Seeds, which Nature ſcatters for a ſucceeding Crop.

From this Diſtinction the Farmer will ſee they are to be the Subjects of different Treatment. The perennial Weeds ought to be got out in the tilling of the Ground, their Roots being torn up by the Inſtruments: the annual are to be cleared away by a particular Practice afterwards; that is by hoeing: for they are not in Being when the Tillage is performed.

Beſide the Effect of Wind in bringing Seeds of theſe Plants upon the Ground, there is another Source from which many riſe: this is from Seeds buried there in former Tillage.

The Seeds of theſe, like thoſe of better Plants, will not grow unleſs they are near the Surface; but many of them will continue good when buried at a greater Depth, and grow when they are brought nearer the Air by Tillage.

The Farmer will ſee from this it is impoſſible to guard againſt Weeds, and that his Point muſt be to deſtroy them.

Every Method of right Huſbandry aſſiſts in reducing their Number; but none can utterly deſtroy their Seeds or Roots.

The better Fences are kept up, the fewer Seeds will be brought into the Grounds; becauſe the greater Part of thoſe that are brought by the Winds, are ſtopped by the Leaves, and fall there. This is the Reaſon why Hedge Bottoms are, in Spite of their ſheltered Condition, always ſo full of Weeds.

In the ſame Manner the better Tillage is uſed, the more the Roots of perennial Weeds will be torn up and taken out of the Ground; but in all this there will be ſtill Room for ſome Encreaſe.

Some Seeds will come in, and ſome will be ripened upon the Spot; ſo that notwithſtanding the beſt Care that can be taken to prevent their Growth, a great deal will alſo be required afterwards to deſtroy ſuch as riſe.

Weeds are in this Manner to be expected in all Places; and they will out-grow all Crops.

This riſes from a plain Reaſon: they are Natives of the Soil and Climate; and will therefore thrive better in it, than ſuch as are raiſed by Art.

It is a great Advantage in the Drill and Horſe-hoeing Huſbandry that they can from Time to Time be deſtroyed as the Crop is growing; and that every Time they are cut up the Ground receives a Kind of Tillage.

In the common Method they grow with the Crop; and as they are naturally more vigorous, they draw the greater Part of the Nouriſhment from it.

CHAP. II.

Of the ſeveral Kinds of Weeds.

EVERY Thing that grows without being ſown or planted, among a Crop that has been ſown or planted, is in that Place a Weed. The whole Benefit of the Tillage was intended for the Crop, and this robs it of a Part.

In general thoſe Weeds are moſt numerous which riſe from Seeds; and thoſe moſt difficult to be extirpated which come from Roots. *Sow-thiſtles* in Fields, and *Groundſell* in Gardens, are an Inſtance of the firſt Kind, and *Reſtharrow* of the latter; a Plant whoſe Root is ſo tough that it will impede the Progreſs of the Inſtruments according to its Name; and ſo full of Vigour in every Part, that the leaſt Morſel ſlightly covered will grow.

But there are ſome which have both theſe ill Qualities of propagating quickly and abundantly by their Seeds, and ſpreading and riſing alſo from their Roots.

Coltsfoot is an Inſtance of this Kind, its Seeds are winged with Down like the Groundſell or Sowthiſtles, and the Root is as tough and full of Life as that of *Reſtharrow*; theſe are the moſt pernicious of all.

Couchgraſs propagates almoſt entirely by the Root; but it ſpreads ſo faſt and ſo far, that nothing is more prejudicial.

From this Review of the ſeveral Natures of Weeds, the Farmer will know how he is to conduct himſelf in this Reſpect.

Let him when he is about to enter upon the Tillage of a Piece of Ground, conſider what are the Weeds upon it, and by that determine his Method of working: for all Lands the Horſe-hoeing Huſbandry is preferable in this Reſpect to the other, but moſt of all where the Ground is over-run with perennial Weeds. Let him take Care he know theſe by Sight, and underſtand what he is to do by their Appearance.

If he ſees the *Common Way Thiſtle*, this is one of thoſe of the worſt Kind, its Roots creeping and ſpreading, while its Seeds fly by Means of the Down.

Fern is another terrible creeping rooted Weed; and *Melilot* is hateful, not only by its abundant Propagation, but its abominable Flavour. Such as this hurt the Farmer two Ways; they impoveriſh his Crop, and give an ill Condition to the Grain. Wild Garlick does the ſame Damage.

Wherever there are an Abundance of theſe Thiſtles, and ſuch other of the rooted Kinds, let the Farmer underſtand that the Ground will coſt him much more Expence than under any other Condition, whatſoever Method he follows; and that his beſt Practice is to tear it up with the four coultered Plow, to harrow away the Roots immediately after every plowing, and to work it up by the Drill and Horſe-hoeing Method.

This will in a few Years perfectly clear it of the worſt Weeds that can infeſt it, be they ever ſo abundant; and if he follow any other Practice, they may remain Torments to him throughout the longeſt Leaſe.

The

The deep Plowing we have directed, and the repeated Harrowings will tear up and draw off a very great Part of theſe Roots; but as any ſmall Fragments will grow and ſoon encreaſe to any great Length, they would after this, be all the Care poſſible employed in it, riſe among the Crop, and ſtrengthen themſelves in the Ground during its Growth: whereas in the Horſe-hoeing Method, the very ſmalleſt Fragments as ſoon as they begin to grow will be torn up and thrown out in the Intervals, and very eaſily cleared from among the Rows of the Crop; and as theſe Intervals of the preſent Year are to be the Places of Rows of Crop in the ſucceeding, it cannot be but that the Ground muſt in a few Seaſons be perfectly cleared from them.

We have upon many Occaſions, and for various Reaſons, ſtrongly recommended this Practice in the preceding Parts of this Work; and we cannot but add this as one very eſſential Preeminence it has over the common Method, or any other ever brought into Uſe.

CHAP. III.

Of clearing the Ground of Weeds.

THE Conſideration of Weeds is very eſſential to the Huſbandman, becauſe ſcarce any of his Land eſcapes from being abundantly infeſted with them; and none is ever entirely free. They utterly deſtroy ſome Crops; and they never fail to injure others in Proportion to their Number and Nature.

The Hand-hoeing will, in ſome Caſes, anſwer the Purpoſe with the annual Weeds, as the Horſe-hoeing does with the others; but even this, in the common random Way of Sowing, is a Thing ſcarce practicable.

We have told the Farmer what he is to do in a Land over-run with the perennial Kind; and we ſhall ſuppoſe him now about to undertake a Piece that is tolerably free from theſe, but is abundantly covered with the annual ones. In this Caſe, as well as the other, the Horſe-hoeing Method is vaſtly preferable to any other, becauſe it not only effectually deſtroys ſuch as riſe after the Sowing, but makes them uſeful as a Manure: but if the Farmer is averſe to this, let him take a middle Courſe.

Where he ſees this abundant Growth of Annual Weeds, he may be ſure there will be a proportional Increaſe among his Crop: they muſt be deſtroyed, or they will ſtarve his Corn, by drawing to themſelves the far greater Part of the Nouriſhment: in the common random Way of Sowing, nothing is ſo difficult as to get out Weeds in the Growth; but in this Caſe it would be impracticable: therefore if he will not admit the Hoe-Plough into wide Intervals, at leaſt let him ſow by the Drill with ſomewhat narrower, that his Crop may ſtand clear, and well diſtinguiſhed from the wild Growth; and that the Hoers may eaſily and conveniently clear the Ground between the Rows with Hand-Hoes.

This is an Improvement of the common Practice, and will be of great Service; becauſe the Hoers, while they clear the Intervals between the Rows, may alſo draw up the Weeds by Hand that grow among the Crop in the Rows; but this is by no Means comparable in the Effect to the other Method.

The Hand-Hoers leave Parts of the Roots in the Ground, and after the firſt Shower there is a new Crop of the Weeds; but the Horſe-Hoe, tearing up the Roots, admits of no ſuch ſpeedy Return.

Theſe are the Methods the Huſbandman will find moſt ſucceſsful; but if he be ſo devoted to the old Method, that no Proſpect of Advantage can lead him out of his beaten Tract, then his proper Recourſe muſt be to a Summer's Fallow; and this muſt be carefully obſerved. The more the Ground is infeſted with Weeds, the more Care muſt be taken in the turning up the Ground.

A dry Summer will deſtroy a vaſt Number of them, when they are thus from Time to Time torn up as they riſe, and expos'd to the Sun; but there are Seeds that will lie under very little Diſadvantages a whole Year without ſhooting, and on theſe the Fallow takes no Effect.

The wild Oat is of this Kind, and ſeveral others; for there are Plants whoſe Seeds naturally lie twelve or eighteen Months in the Ground.

Theſe eſcape all the Farmer's Diligence in a Summer Fallow; they are not to ſhoot till the ſucceeding Spring, and then they come up with great Vigour, as if the fallowing had been a Preparation of the Earth for them.

Thus altho' a Summer's Fallow is the beſt Expedient the Farmer can uſe who will not follow the new Improvements, yet it is not to be compar'd in Efficacy to the Methods they offer for his Service.

It will deſtroy a great many Weeds, but the Horſe-hoeing Method utterly extirpates all; and that without the Loſs of the Seaſon ſacrific'd to the Operations of Fallowing.

We repreſent theſe Things to the practical Farmer as they are, on theſe repeated Inſtances; and hope the ſeveral Proofs of Advantages of various Kinds attending on the Practice of the new Method, will, when he ſees them thus candidly laid before him, induce him to follow it.

The Seeds that lie this length of Time in the Ground, and eſcape by that the Summer's Fallow, are not the only Source of a ſucceeding Year's Growth of Weeds; a vaſt Number are brought in with the Dung and other common Manures, and the great Quantity beſide riſing from Seeds, wafted in by Winds, join in ſhewing that a Method of Huſbandry which deſtroys them while the Crop is growing, muſt much more perfectly anſwer the Purpoſe, than one by which they are only kill'd before the Sowing.

Dung, which is the univerſal Manure in moſt Places, is compoſed chiefly of the Stalks of Corn; and, among theſe, there go into the Litter the Stalks of Weeds and their Seeds; therefore while the Farmer is enriching the Land for his Crop, he is alſo ſowing Weeds to reap the Benefit of it.

Theſe will be ſure to riſe in their full Number, and they will thrive upon the newly-enrich'd Soil abundantly. They can only be deſtroy'd while

while the Crop is growing, becauſe they only grow with it. The Farmer will ſee by this, as by the other Inſtances, that there is no Way of deſtroying Weeds ſuited to his Purpoſe, or that can be effectual, but the doing it while the Crop is growing.

He is ſenſible of this; and in ſome Caſes attempts it, by weeding among his Corn: but this is a Method the worſt calculated for real Benefit of all that ever were introduced into Huſbandry.

The Feet of the Weeders muſt do harm, and it is often more than their Hands do good. The Corn ſtanding irregularly, there is no avoiding trampling ſome of it down; and in other Crops which more reſemble Weeds in their firſt Shoot, there is beſide the Damage of the treading them down, the Danger of tearing them up; and great Miſchief happens both ways.

This is the Caſe with the annual Weeds, and it is ſtill worſe with the perennial: they cannot be torn up, becauſe that would tear up ſome of the Corn with them. All that can be done is the cutting off their Heads; the nearer the Root, the better; but ſtill however near this is done, the Remedy is only ſlight, temporary and imperfect; the Root remains in all its Vigour, and new Shoots preſently riſe in the Place of the old one. Theſe are commonly more numerous than the old, and conſequently they draw more Nouriſhment. Thus what appears a Remedy, is, in theſe Caſes, an Increaſe of the Diſeaſe.

All this is obviated by the Horſe-hoeing Huſbandry: that tears up and deſtroys all Weeds without any poſſible Damage to the Crop. This is plain to Reaſon, and it is found true by Experience; and with this laſt Recommendation, added to the many we have occaſionally named before, we cloſe this Part of our Treatiſe.

End of the FOURTEENTH BOOK.

A COMPLEAT BODY OF HUSBANDRY.

BOOK XV.

Of the poiſonous and hurtful Plants native of this Kingdom.

In TWO SECTIONS.

The INTRODUCTION.

HAVE thus, in a compleat Courſe of the Practice of Huſbandry, to the utmoſt of our Power, acquainted the Farmer with every thing he ought to know, and every thing he ought to do for the Succeſs of his Buſineſs and Improvement of his Crops. We have occaſionally, together with what he is to undertake, ſhewn him what he is to avoid, and there requires but the ſingle Article we are here to treat of, to finiſh the Deſign; which, if the Execution have been at all proportioned to the Intent, and to the Aſſiſtances received for compleating it, we hope will be a Benefit to the Public and to Poſterity.

In treating of the Diſorders of Cattle, we have mentioned their eating unwholſome Plants; and it is theſe we are to conſider more at large in this Place. This Kingdom does not afford many; but what there are the Huſbandman ought to know, for the Security of his Stock, and of the young among his Family.

Inſtinct gives Creatures a general Direction not to feed on hurtful Things; but they ſometimes neglect the Caution; Appetite in them, as well as in ourſelves, getting the better of all other Admonition. To us who have Reaſon, this Inſtinct is not given; and while too young to exert it, we are in the Way of Danger; nor are we at any Time, without due Information, altogether above the Power of Accidents of this Nature.

It is for this Reaſon we ſhall here give the Huſbandman the full and diſtinct Knowledge of what hurtful Plants will fall in his Way, adding to their Deſcriptions the Aſſiſtance of Figures, that he may deſtroy them wherever he perceives them riſe.

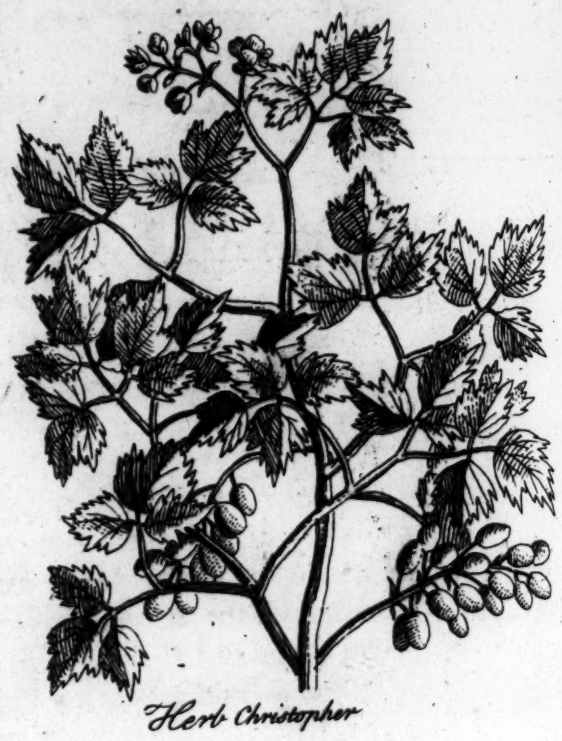
Henbane

Hemlock

Deadly Nightshade

Water Dropwort

Dog's Mercury



Herb Christopher

Water Crowfoot

The Yew Tree

White Rot

Common Sundew

Red Rattle

Spurge Laurell

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BOOK XV.

SECT. I.

Plants abſolutely poiſonous.

OF theſe we are ſo happy, that there are no more than eight naturally wild in England: the Farmer will, from the Figures and Deſcriptions, eaſily be acquainted with this ſmall Number: we ſhall give him an Account of their Effects, not exaggerated by Fancy of falſe Hiſtories, but from Experience and Authorities above the Reach of Queſtion; and he will thus know what he is to avoid, both with Reſpect to his Family and his Cattle; and why he is to avoid them.

CHAP. I.

Of Henbane.

HENBANE is a large ſpreading Plant: it is capable of doing great Miſchief; and, unhappily for the Farmer, it is not confined to Woods or remote Places, but grows naturally upon Ditch Banks, and is common almoſt every where.

Nature which has thrown it thus in the Way of Mankind, yet has ſtamp'd ſo ſtrong a Mark of its Qualities in every Part, and given Notices of its hurtful Properties ſo evidently to all the Senſes, that ſhe ſeems to have rais'd a ſufficient Caution againſt any Danger.

It differs from all other Plants in the Form and Hue of its Leaves: its Flowers are of a deadly diſmal Colour; and the whole Plant forbidding in its Aſpect. The Eye marks it for a Poiſon; and when offered to the other Senſes, they anſwer in the ſame Language. Its Taſte is filthy and nauſeous, but this cannot eaſily come into Tryal; for its Smell, which will be perceiv'd firſt, is offenſive and forbidding.

By this diſmal Look, and this forbidding Smell, has Nature warn'd Men to beware of Henbane tho' they ſee it frequent about their Dwellings: we ſhall prevent the Poſſibility of miſtaking it for any other Plant, by adding the Deſcription of its ſeveral Parts.

The Root is thick, long, and irregular in its Shape. From this riſe eight or ten Leaves. They are very large, long, and of a whitiſh or a greyiſh green Colour. They are very deeply indented at the Sides, and of a ſtinking filthy Smell.

The Stalk grows up in the midſt of theſe, and is whitiſh, hard, woody, full of Branches, and two Feet high. The upper Branches ſpread out very much.

Many Leaves grow upon this, like thoſe that firſt riſe from the Root: and of the ſame Smell.

The Flowers are numerous and large, but they are not conſpicuous. They are hollow, like a Bell, and are of a dead Colour, vein'd in a very curious Manner with Purple.

After theſe come ſhort thick Seed-veſſels, which are full of ſmall brown Seeds.

Every Part of this Plant is poiſonous, and it deſtroys People by throwing them into Drowſineſs, like a Lethargy, with Convulſions.

Cattle will ſometimes eat the young Leaves of it; and this throws them into the Sleepy Evil, deſcribed before: if they have eat a great deal no Medicines can recover them. Hogs will grub up the Root, and it affects them in the ſame Manner.

Chickens will pick out the Seeds; and if they eat a large Quantity, they die by it. This is the Reaſon of its Name *Henbane*.

Theſe are ſufficient Reaſons why the Farmer ſhould let none of it grow near his Fields; but there is yet greater Cauſe for tearing up in his Yard where it is very common.

There have been Inſtances of Country Fellows eating the Roots by Miſtake; and they have dy'd in the moſt miſerable Manner in Convulſions, and with gnaſhing of their Teeth.

The Seeds of white Henbane which are uſed in Medicine, are thoſe of a different Plant. This is altogether poiſonous.

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CHAP. II.

Of Hemlock.

THIS is another of thoſe poiſonous Plants which Nature, for Reaſons to us unknown, has made to grow in great Abundance near our Habitations.

It is not characteris'd like Henbane, by a peculiar forbidding Aſpect; yet it is a gloomy-looking Plant, and by no Means inviting to the Eye. Its Smell alſo is heavy, and ſeems to the moſt ignorant Perſon unwholſome.

There is a Sort of Hemlock which grows of itſelf in Gardens, and reſembles Parſley; but this, tho' a very unwholſome Plant, is not the poiſonous Kind. That is the large Kind which grows wild in Hedges; and it is ſufficiently diſtinguiſhed by its Height, its Aſpect, and its painted Stalk, to prevent any Miſtake to the Farmer, who ſhall have obſerved its Deſcription and its Figure.

The Root is white, thick, long, and of an unpleaſant Smell.

The Leaves that grow from this are very large, two Foot broad, but divided into innumerable ſmall Parts, in a regular and beautiful Manner; and they are of a dull and blackiſh green.

The Stalk grows up in the midſt of theſe, and it is two Yards high, and as thick as a Child's

Child's Arm. It is of a deep dingy green, but painted in a very ſurpriſing and beautiful Manner with Manner with Purple, ſo that it reſembles the ſpeckled Skin of a Snake.

The Flowers are white, they are ſmall ſingly, but they ſtand in thick and large Cluſters at the Tops of the Branches.

The Seeds are roundiſh, of a pale green Colour, and ſtriated. Two come after every Flower.

There are ſeveral other Kinds of this, beſide that firſt mentioned, and the preſent; eſpecially a very ſingular one with a thick Stalk, that grows in Waters. They are all of a poiſonous Quality; but this common Hedge Kind worſt of all.

The Stalks are the moſt poiſonous Part; and next to them the Seeds. Some pretend the Root has ſcarce any bad Qualities; but this is not confirmed upon ſufficient Experience.

The Athenians extracted the Juice of Hemlock from the lower Parts of the Stalks before the Plant roſe up to flower; and with this Poiſon they executed Criminals inſtead of hanging. Socrates died by this Doſe.

The Knowledge of the poiſonous Qualities of Hemlock is ſo common, that we do not hear of any bad Effect among our own Species who are guarded againſt it: but many of thoſe Diſeaſes of Cattle which perplex the Farmer and the Farrier, and at length end in the Creature's Death, are the Effect of eating the young Shoots of this Plant. Some Birds feed upon the Seeds without Hurt; but they are fatal to other Creatures.

CHAP. III.

Of Deadly Nightſhade.

THIS is a Plant not ſo common about Towns and Houſes as the others; and that wherever it is ſeen ſhould be rooted up, for it is fatal to Children. Nature, which has not planted this in the Way of Men ſo much as the other two, has not been careful to mark it as thoſe for a Thing to be dreaded. On the contrary, it is an extremely beautiful Plant, yet with a ſomewhat melancholy Aſpect.

The Root is long and thick, and it creeps under the Surface of the Ground.

From this riſe many large and broad Leaves of a deep green Colour, and not at all notch'd or divided at the Edges.

The Stalk is round and thick, divided into many Branches, and a Yard high. It is full of Leaves like thoſe from the Root, and toward the Top has many Flowers.

Theſe are large, hollow like a Bell, and of a duſky Purple Colour.

After theſe come Berries which are large, and of a very tempting Aſpect; they are of a ſhining and jetty black, and are as big as large black Cherries. They are ripe in July and Auguſt.

Children are tempted to eat theſe, and they are always fatal. A ſingle Berry will bring on Convulſions; but they ſeldom ſtop with one or two. They commonly die miſerably a few Hours after eating them.

I remember an Inſtance of two Children in Northamptonshire, who eat immoderately of them and did not live to get Home. They were track'd from the Plant to the Place where they fell by bloody Stools, and there died in Convulſions.

CHAP. IV.

Of Water Dropwort.

THIS is a Plant, which, like the former, has been fatal to many Perſons who have been tempted by the cleanly Look to eat of it; and which the Farmer ſhould know, that he may guard againſt it with the utmoſt Care. The Root in this Plant poſſeſſes the greateſt Degree of Poiſon.

It always grows by Waters, and is very common in moſt Parts of the Kingdom.

The Root is compoſed of ſeveral long and large Pieces which reſemble Parſnips in Shape and Colour, and are of a ſharp Taſte.

The Leaves that riſe from theſe are large, and of a pale green, and they are divided into a great Number of Segments.

The Stalks riſe ſeveral together, and are upright, divided into many Branches, and a Yard high.

They have ſeveral Leaves upon them like thoſe from the Root, and of the ſame faint Colour.

The Flowers are ſmall and yellowiſh; they grow in great Tufts at the Tops of the Stalks, and after every one of them there come two ſmall Seeds.

The Roots when they are freſh taken up have an inviting Aſpect: they run out a white Juice like Milk when cut; and this preſently after turns yellow.

Many have eat of them, and all died. We have Inſtances of the ſad Effects from very early Time; and within theſe few Years the ſame fatal Scene has been repeated. They take the ſame Effect whether raw or boiled; and thoſe who eat them die raving and in Convulſions.

CHAP. V.

Of Dog's Mercury.

THIS is another of thoſe Plants which tempt the Ignorant by their pleaſing Aſpect, and are in their Effects fatal. The whole Herb appears very inviting; it is freſh and green at a Time when every thing elſe is dead; and many have eat it raw or boiled, and periſhed by it.

It is a Plant common under our Hedges, and on which Nature has ſtamped no Mark of Caution: on the contrary it has a very alluring Look.

The Root is ſlender and long; it divides into many Branches, and ſpreads under the Surface of the Ground.

The Stalks are round, upright, not at all branched, of a faint green, and about a Foot high.

They are almoſt naked toward the Bottom, but nearer the Top there ſtand many Leaves; theſe are long and notched at the Edges; and they are of a very bright pleaſant Green.

The Flowers are inconſiderable. On ſome Parts there ſtand Spikes of a greeniſh Colour, and on others Seeds, which are as it were double.

The Plant is in full Vigour early in Spring, and its freſh, green, and wholeſome Look has tempted many to boil it for Food. Whole Families have been poiſoned by it. The Children have generally died; ſometimes the Father and Mother have recovered; but in other Inſtances all have periſhed together. They die in Convulſions, and in the greateſt Agonies.

CHAP. VI.

Of Herb Chriſtopher.

THIS is a Plant as fatal in its Effects as any; but very happily it is found in few Parts of this Kingdom, and there generally in Woods, and far remote from Dwellings.

The Root is long, thick and whitiſh.

From this riſe ſeveral large Leaves, ſupported on long, reddiſh Foot-ſtalks. Each Leaf is divided into many ſmall Parts, or is as it were compoſed of many ſmall ones; and it is of a deep green Colour.

The Stalk riſes in the Midſt of theſe, and is round, upright, reddiſh, and two Feet high.

Several Leaves grow upon this, which in all Reſpects reſemble thoſe from the Root, and are when rubbed or bruiſed of an unpleaſing Smell.

The Flowers ſtand in long Cluſters upon ſmall Stalks growing at the Top of the Plant, and from the Boſoms of the Leaves; they are ſmall and White.

The Berries that follow theſe hang in the Manner of Bunches of Currants, and they are of a ſhining black Colour. They are ripe in Autumn.

Children who have gone out to gather Blackberries have been tempted to eat theſe, and have in Conſequence died in Convulſions The Plant has been from this named Bane-berries. The young Shoots alſo poiſon Cattle.

CHAP. VII.

Of Water Crowfoot.

EVERY one knows the common Crowfoot of the Meadows, which Children call Butter Cups: this is of a burning and cauſtick Quality; but there is one Kind of it which has been ſometimes eaten, and has never failed to prove a very deſperate Poiſon, deſtroying People in a particular and very frightful Manner. This Kind is common in watery Places, and is perfectly different from all the others, and indeed from all other Plants; ſo that the Huſbandman will have no Difficulty in knowing it at Sight, by the Means of our Deſcription and Figure.

The Root is compoſed of a great many fine white Threads.

The Leaves riſe from this, a great many together, and they are broad, of a roundiſh Shape, but irregularly divided about the Edges into three or more Parts: they are ſmooth, of a ſhining Surface, and of a pale yellowiſh green Colour.

The Stalk riſes up in the Midſt of theſe, and is very thick, fleſhy, of a pale green Colour, two Foot high, and divided into a great many Branches.

Several Leaves grow upon this which in all Reſpects reſemble thoſe from the Root, and are like them of a pale green Colour.

The Flowers ſtand at the Tops of the Branches: they are very ſmall and yellow; and they reſemble the common Crowfoot Flowers in Shape, but they are paler coloured.

The Seeds follow theſe, and are ſmall and green; they ſtand cluſtering together in a Kind of oval Heads, and eaſily fall off when touched.

The Plant is common about the Edges of Ponds; and where Water has ſtood in Winter. Its Leaves are up early in Spring, and by their Freſhneſs tempt Cattle and ſometimes Men to eat them. They are the Cauſes of many of thoſe Diſorders which affect Cows and Oxen in the early Seaſon.

Their Effect on Mankind is terrible: Death is a certain Conſequence; and they die laughing.

CHAP. VIII.

Of Yew.

THE Yew is a Tree too well known to need a long Deſcription. Its Trunk is covered with a reddiſh Bark. Its Branches ſpread irregularly, and its Leaves are compoſed of many ſmall and narrow ones, which ſtand regularly on the two Sides of a Stalk in Rows, and are of a blackiſh Green.

The Fruit is of a particular Form and Appearance; it is compoſed of a green Button placed in a red juicy Cup, reſembling the Huſk of an Acorn.

The Tree is wild in our Woods in many Places, and is planted alſo for Ornament; being an Ever-green.

Children eat the juicy Part of the Fruit, which happily is not poiſonous, or in the leaſt of Kin to the reſt of the Tree.

The Farmer's Care muſt be to keep his Cattle from the Leaves. They will frequently eat the Clippings thrown out of Gardens, or the young Shoots when it is planted where they can get at it.

When they eat but little of it, they fall into Diſorders which often end in their Death: but when they ſwallow it in a larger Quantity, they die preſently.

BOOK XV. SECT. II.

Such as are not abſolutely poiſonous, but very hurtful.

CHAP. IX.

Of White Rot.

THIS is a little obſcure Plant, which often grows in great Abundance where it is little minded, and is the Cauſe of very terrible Miſchief to the Farmer.

It conſiſts principally of a Parcel of Stalks which lie upon the Ground; and ſpread themſelves about in a very irregular Manner. They are as ſmall as a Packthread, and of a pale whitiſh green. Sometimes they riſe a little upwards, but rarely.

Theſe Stalks ſend down little Tufts of fibrous Roots in various Places; and generally where theſe ſhoot from the lower Part, there riſe alſo from the upper Side, Leaves.

Theſe are as large as a Half Crown-Piece, and of a round Shape, but indented irregularly at the Edges. The Stalk which ſupports them, is long and ſlender; and it is inſerted not at the Edges, as in moſt other Plants, but in the Middle.

The Colour of the whole Leaf is whitiſh, and it is of a thin Subſtance.

The Flowers are very ſmall and inconſiderable: they are of a pale Colour, and they ſtand on ſlender Foot-ſtalks riſing from the Boſoms of theſe Leaves, or the Part where their Foot-ſtalk joins to the main Stalk. The Seeds are ſmall and brown.

This is the whole of a Plant, whoſe low Condition renders it unſuſpected by the Farmer, while it is the Ruin of his Flock.

It is very common in marſhy Grounds, where it runs cloſe to the Bottom, and is hid among the Graſs.

The Sheep find it, tho' their Owner does not perceive it; and they eat of it abundantly among the Graſs, being pleas'd with its ſharp Taſte. The Conſequence is, their falling into that terrible Diſtemper the Rot: from which few, that have ſwallowed any large Quantity of this Herb, eſcape.

CHAP. X.

Of Sun-dew.

THIS is another of thoſe Plants which is fatal to Sheep; and which, in the ſame Manner, is often overlook'd by thoſe who know its bad Effects; by Reaſon of its Smallneſs: but in this they are the leſs to be excus'd, becauſe, tho' a very little Plant, its Singularity renders it conſpicuous.

It is but about ſix Inches high, but it ſtrikes the Eye at firſt, by being all over of a red Colour; and, upon a cloſer Examination, it ſurpriſes yet more, by being covered with large Drops of Water in the moſt violent Heats: it hence obtained the ENGLISH Name Sun-dew; and it is alſo called frequently Roſa Solis.

The Root is compoſed of a few ſmall Fibres.

The Leaves riſe in a little Tuft eight or ten together. Each is ſupported on a long ſlender Foot-ſtalk. They are of the Bigneſs of a Silver Penny, round, of a red Colour, but covered with very long and ſtiff yellow Hairs: upon theſe reſt the great Drops of Water.

The Stalk riſes in the midſt of theſe, and is about ſix Inches high: it is upright, very ſlender, and has no Leaves upon it. It generally divides into two Parts at the Top, but otherwiſe it has no Branches.

The Flowers grow in a Row at the Top: they are ſmall and white; and they ſeldom open perfectly. The Seed-veſſel is ſhort, and the Seeds are very ſmall.

This Plant grows, like the former, on boggy Grounds; and it has, like that, a ſharp Taſte, for which the Sheep like it. They eat it too frequently, and its Effects are the ſame as thoſe of the former. It brings on the Rot; and thoſe which have eat much are incurable.

CHAP. XI.

Of Louſewort.

THIS is another Inhabitant of the wet and marſhy Grounds, which is hurtful to Sheep in a terrible Manner, though not ſo fatal as the others.

It is a much larger Plant than either of thoſe, and eaſier ſeen, but it is as often overlook'd or diſregarded.

The Root is compos'd of a vaſt Number of Fibres, which run deep in the Ground.

The Leaves riſe in little Tufts from this, and they are ſmall, and beautifully divided into a Number of leſſer Parts. They are of a fleſhy Subſtance, and of a faint green; but very often they are brown, and ſometimes reddiſh.

The Stalks are weak, and do not ſtand well upright: they are ſix or eight Inches long, and of a reddiſh Colour. They have many Leaves on them, in all Reſpects reſembling thoſe which grow from the Root; and at their Tops ſtand the Flowers.

Theſe are gaping, and of a full red; and they ſtand in reddiſh and ſtreaked Huſks.

All our wet Meadows abound with this Plant. Its juicy Subſtance and Taſte allure the Sheep to eat of it; in thoſe Places eſpecially where there is but little Graſs, which is too common a Caſe where this Plant is abundant; and it throws them into many Diſorders.

There is no Herb that has ſo ſpeedy, evident, and certain an Effect in fouling the Blood. The moſt healthy and clean Flock, will, in a Fortnight, grow ſcabby and ſcurfy upon the Skin; their Wool will be looſe, and they will be overrun with Vermin.

We have, in a preceding Part of this Work, delivered the Method of curing this Diſorder; and the Farmer muſt be careful to obſerve the Direction of removing the Sheep under Cure to a dry upland Paſture. Thoſe are Places where the Plant cannot grow; and there is no Security but that of the Creature's not feeding upon it, while under Cure.

CHAP. XII.

Of Spurge-Laurel.

THIS is a ſhrubby Plant of a very pleaſing Aſpect, and worthy to be introduced as an Ornament into Gardens; but it is one that the Farmer ſhould extirpate carefully from his Fields when he happens to have it. The ſingular Appearance renders it eaſily known, and it is only found on hilly Grounds.

The Root is compoſed of ſeveral long and tough Fibres.

The Stem is as thick as a Man's Thumb; and it is covered with a brown Bark.

Toward the Bottom it is naked; but there are numerous Leaves about the upper Part. The whole Shrub is three or four Foot high; and the Leaves grow principally at the extream Ends of the Branches.

They are long, broad, and of a firm Subſtance: their Colour is a deep green; and they in ſome Meaſure reſemble the Leaves of the common Laurel.

The Flowers grow in Cluſters below the Leaves, and they are ſmall and green.

After them come Berries, which when ripe are black: they are of a longiſh Shape, and have a ſingle large Kernel.

It is frequent on waſte Ground in hilly Places in many Parts of ENGLAND, and flowers very early in Spring.

Cattle are tempted by the Freſhneſs of the Leaves to taſte them; and they are ſo ſharp that they inflame their Mouths. Some will eat them in ſmall Quantities, and the Effect is terrible; they bring on the moſt violent Purgings with bloody Stools; and often theſe Complaints reſiſt the Power of all Remedies, and terminate in the Creature's Death.

I had in the Year 1740 an Inſtance of this in three Cows, which had been ſeen eating the Tops of this Shrub in APRIL. They all fell into theſe Purgings, and though every Method was uſed that could be thought of, all three died.

We have elſewhere in its Place informed the Huſbandman in what Manner he is to undertake the Cure of theſe Diſorders; but it is much better to prevent them by rooting out ſuch hurtful Plants, as are their worſt Cauſe.

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